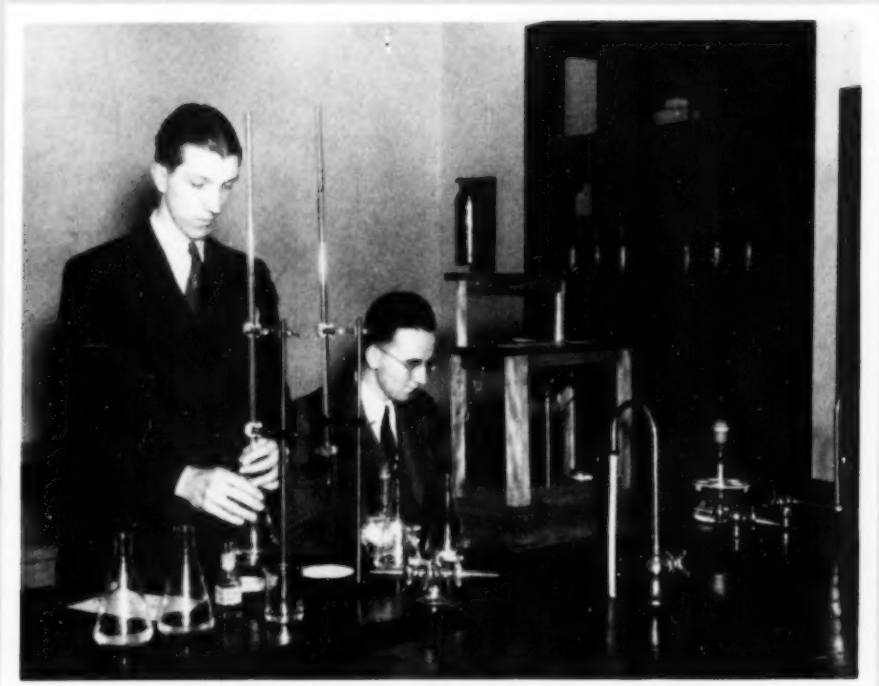
Industrial Arts and Vocational Education

The SHOP TEACHERS' PROFESSIONAL MAGAZINE

MAY, 1953

Vol. 42, No. 5



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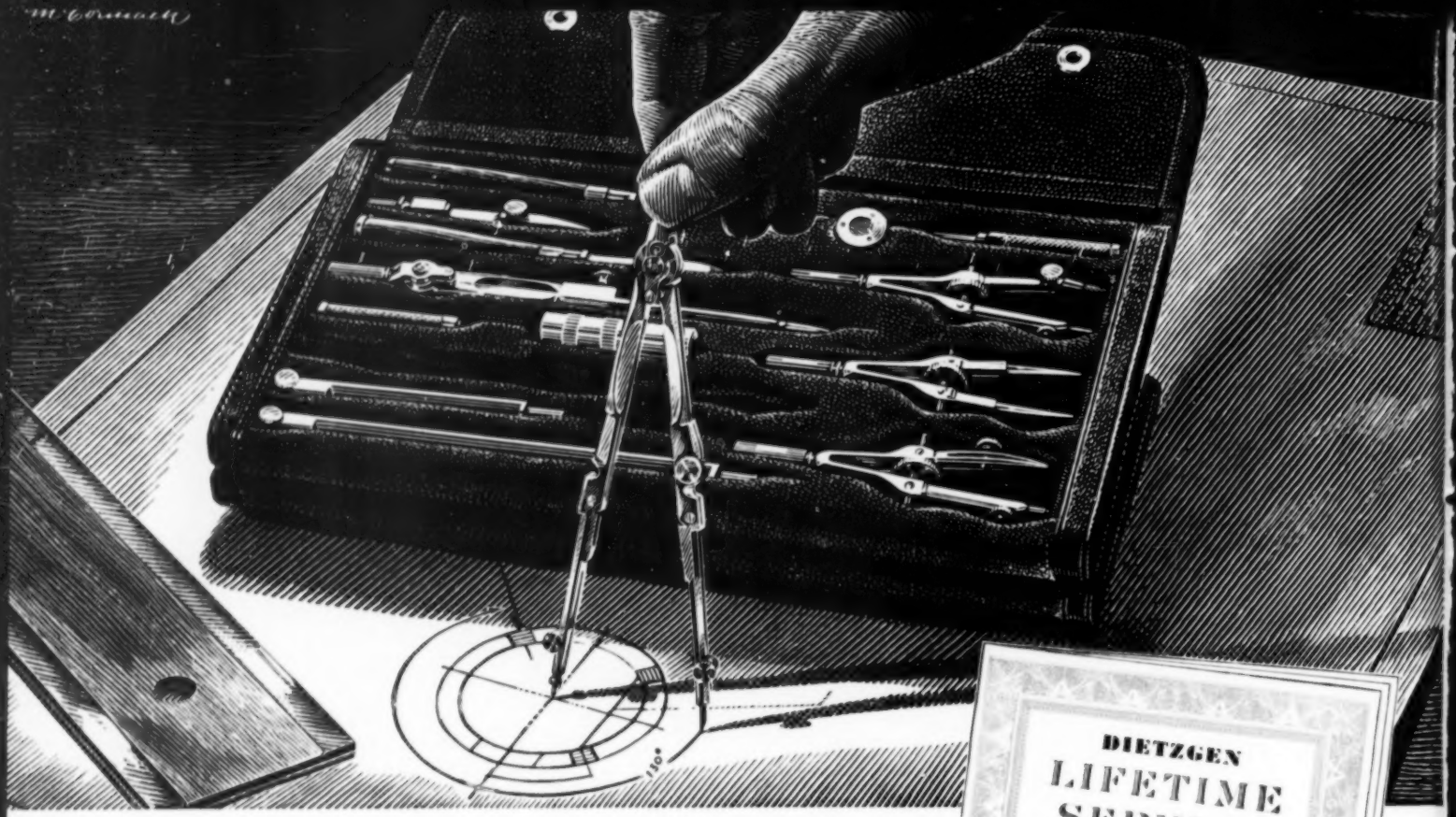

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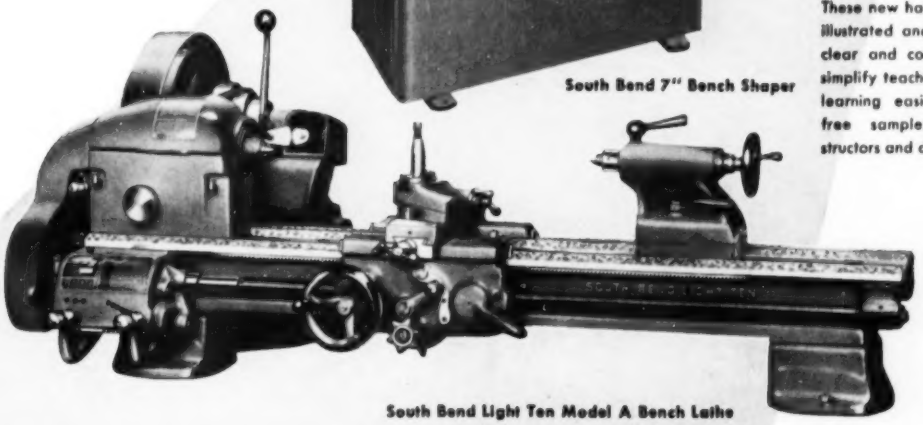

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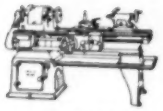
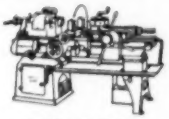
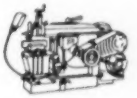


☐ 10" to 16-24" FLOOR LATHES



☐ ½" and 1" Collet TURRET LATHES

☐ 14" DRILL PRESSES



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VOL. 42 NO. 5

INDUSTRIAL ARTS and VOCATIONAL EDUCATION

The Shop Teachers' Professional Magazine

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This Month's Cover

This month's cover shows students performing experiments in the industrial-chemistry laboratory.

Photograph submitted by Benjamin J. Novak, Murrell Dobbins Vocational-Technical School, Philadelphia; and supervisor in vocational education, Colorado A. & M. College, Fort Collins, Colo.; and lecturer in Vocational Education, Temple University, Philadelphia, Pa.

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Association News

COMING CONVENTIONS

Apr. 23–25. New York State Vocational and Practical Arts Association, at Hotel Statler, New York City. Secretary, R. S. Knouse, N. Y. State College for Teachers, Albany, N. Y.

Apr. 23–25. Indiana Industrial Education Association, at Hammond Civic Center, Hammond, Ind. Secretary, H. G. McComb, State Director of T. & I., 215 State House, Indianapolis, Ind.

Apr. 28–29. American Council of Industrial Arts Supervisors, at Statler Hotel, Detroit, Mich.

Apr. 29. American Council of Industrial Arts Teacher Education, at Statler Hotel, Detroit, Mich.

Apr. 30–May 1. Wisconsin Association for Vocational and Adult Education, at Schroeder Hotel, Milwaukee, Wis. Secretary, C. D. Rejahl, 211 N. Carroll, Madison, Wis.

Apr. 30–May 3. American Industrial Arts Association, at Statler Hotel, Detroit, Mich. Secretary, D. Arthur Bricker, 216 E. 9th St., Cincinnati 2, Ohio.

May 1–2. Eastern Arts Association, subregional meetings. Secretary, Lillian D. Sweigart, State Teachers College, Kutztown, Pa.

June 1. Wyoming Vocational Agriculture Teachers Association. Secretary, Hillman Snell, Graybull, Wyo.

June 4–5. National Council of Technical Schools, at Statler Hotel, Washington, D. C. Secretary, J. B. Hershman, Valparaiso Technical Institute, Valparaiso, Ind.

June 10–12. Minnesota Vocational Agriculture Association, at Duluth Hotel, Duluth, Minn. Secretary, Henrik Aune, Morris, Minn.

June 11–12. Georgia Vocational Association, at Municipal Auditorium, Macon, Ga. Secretary, Miss Frances Roberts, Chamblee High School, Chamblee, Ga.

June 14–17. International Graphic Arts Education Association, at Hotel Statler, New York City. Secretary, Otis H. Chidester, Tucson Senior High School, Tucson, Ariz.

June 16–19. Ohio Vocational Agriculture Association, at Ohio State University, Columbus, Ohio. Secretary, Howard Nowells, Logan, Ohio.

June 17–19. Pennsylvania Vocational Association, at Forest Inn, Eagles Mere. Secretary, Ralph O. Gallington, Pennsylvania State College, State College, Pa.

OSWEGO 15TH ANNUAL SPRING CONFERENCE

The State University of New York Teachers College, Oswego, N. Y., will hold their 15th Annual Spring Conference at the college on May 7 and 8, 1953.

The theme of the conference is "Industrial Arts in the Critical Years Ahead."

Dr. Hermann Cooper, executive dean for teacher education, State University of New York, will speak on "Industrial Arts Education for What?"

Paul H. Benedict, district principal, Baldwinsville Academy and Central School, will discuss "Building our Schools for Education Ahead."

Thursday, at noon, there will be an informal luncheon in the Student Union Cafeteria.

On Thursday afternoon visits will be made to

(Continued on page 6A)

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ASSOCIATION NEWS

(Continued from page 4A)

the exhibits in all industrial laboratories, and to the commercial exhibits.

Thursday evening, 6:30 p.m., has been set aside for the annual industrial-arts banquet at Hotel Pontiac, Oswego.

On this occasion Dr. R. Lee Hornbake, professor of education, University of Maryland, College Park, Md., will deliver an address on "Time for Decision."

On Friday at 8:00 a.m., the Epsilon Pi Tau Fellowship breakfast will be held, at which Dr. Elroy Bollinger, industrial teacher training, State Education Department, New York City, will present an illustrated slide narration on "Industrial Arts in our Public Schools."

At 10:00 a.m., Friday, Dr. R. Lee Hornbake will speak on the topic, "Industrial Arts Comes of Age."

An informal luncheon in the Student Union Cafeteria will be held at noon, and the afternoon will be devoted to visits to industrial-arts laboratories and to the commercial exhibits.

Members and friends in the Oswego area are invited to the open house in the evening.

Dr. Gordon O. Wilber, director, division of industrial arts, and his co-workers are working hard to make this conference successful.

THE GRAND CHAPTER MEETING OF IOTA LAMBDA SIGMA

New national officers for Iota Lambda Sigma professional fraternity in industrial education have assumed their duties. These were elected at the annual meeting of the Grand Chapter in Boston in connection with the AVA and are as follows: president: Herman F. Hinton, State Supervisor, T & I Education, Tallahassee, Fla.; vice-president: Dean Lemon, Millersville State Teachers College, Millersville, Pa.; secretary-treasurer: Clyde H. Wilson, Professor Industrial Education, University of Tennessee, Knoxville, Tenn. (re-elected); historian: Leonard R. Booker, State Teacher Trainer, Industrial Education, Clemson College, Clemson, S. C. (re-elected);

National Advisory Council officers for 1953 are: chairman: W. L. Newton, Director Vocational Education, Meridian, Miss.; vice-chairman: Walter M. Arnold, State Supervisor T & I Education, Stillwater, Okla.

BICENTENNIAL CELEBRATION AT COLUMBIA UNIVERSITY

Details of Columbia's bicentennial celebration in 1954 are disclosed in a special brochure being sent to heads of universities, colleges, libraries, and the like, throughout the world.

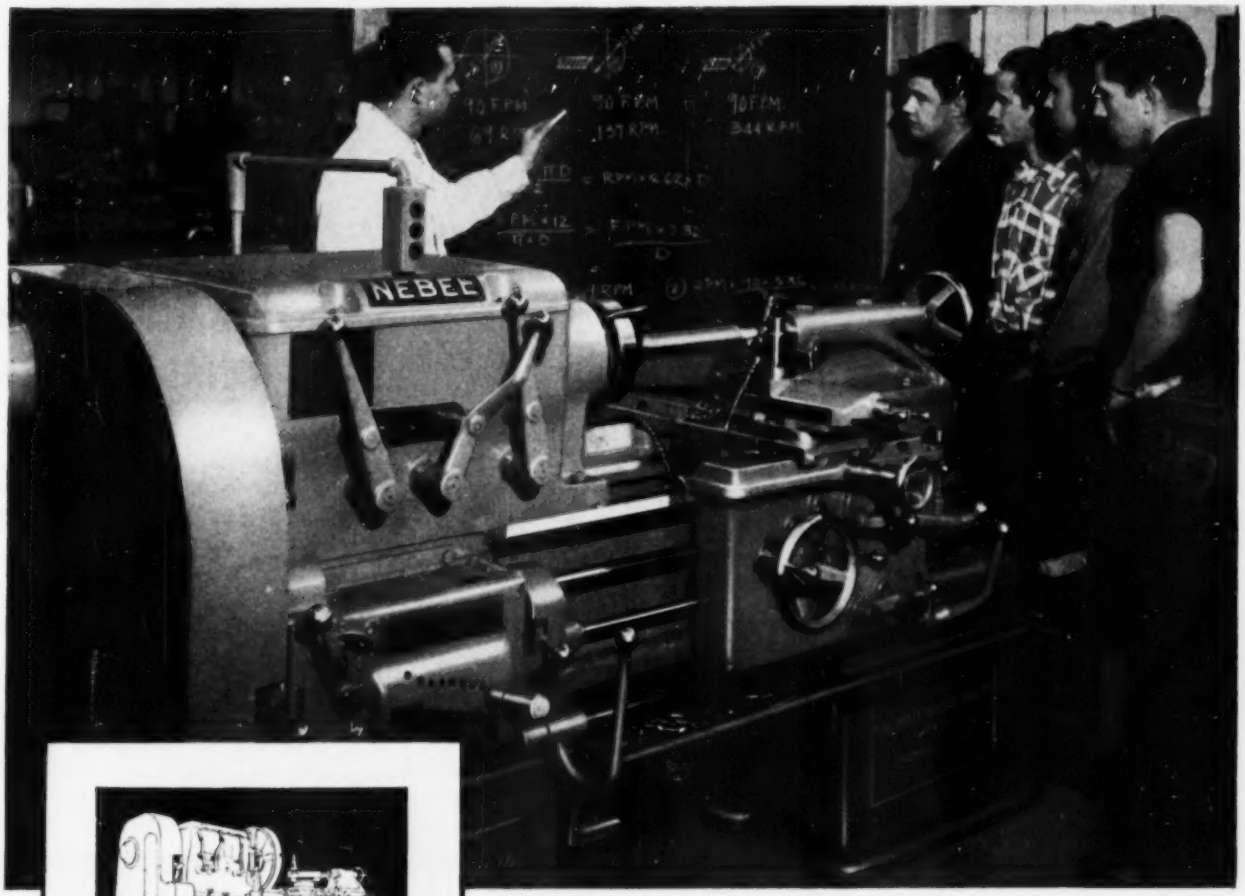
The bicentennial signalizes the granting of a charter by George II of England to King's College, whose first class in 1754 consisted of eight students and one professor. King's College became Columbia shortly after the Revolution.

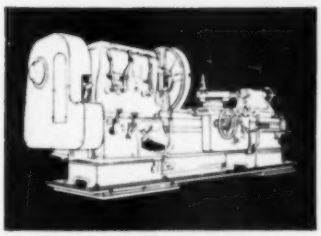
ALLEGHENY COUNTY INDUSTRIAL ARTS ASSOCIATION

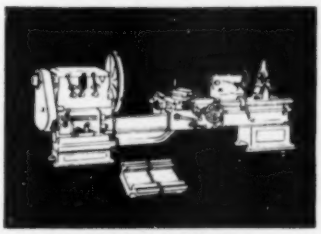
Members of the Allegheny County Industrial Arts Association were guests of R. C. Stucker of the Hardwood Corporation of America on January 28, for dinner at the Mona Lisa Lounge, Brentwood, Pa.

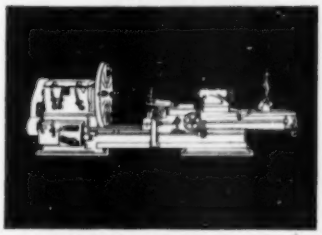
Following the dinner the meeting moved to Baldwin High School for an inspection of the

(Continued on page 26A)




Heavy duty engine lathes 16" to 36" sizes


Removable block gap lathes
18"/27" to 25"/40" sizes


Extension bed gap lathes
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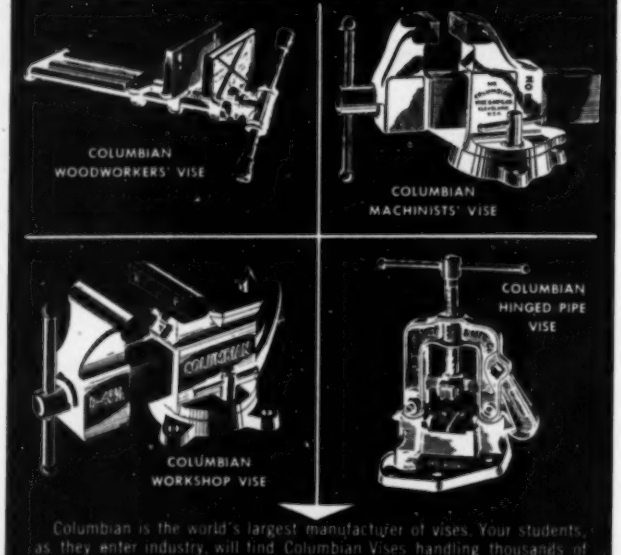

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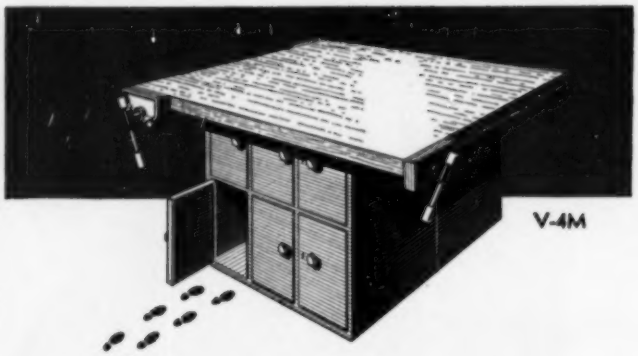

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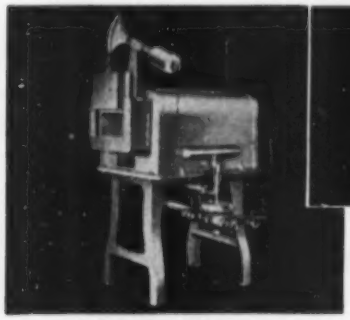

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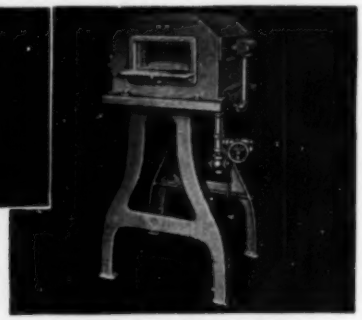


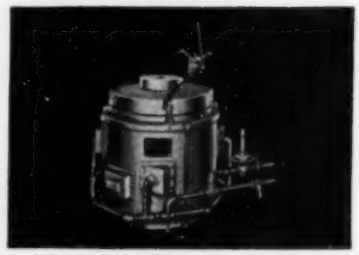
Small Forge

HUNDREDS OF THESE SUNBEAM STEWART FURNACES ARE IN THE VOCATIONAL DEPARTMENTS OF TECHNICAL SCHOOLS

Because Sunbeam Stewart units have been designed for efficient production heat treating in small shops and tool rooms, they are widely recognized as standard equipment for all types of industrial heat treating and vocational training work. For student instruction and reference, write for our free "Guide to Furnace Selection." Aids in determining the type of furnace best suited for any work. Also ask for the new Data File on school units.

SUNBEAM STEWART INDUSTRIAL FURNACE DIVISION OF SUNBEAM CORPORATION (Formerly CHICAGO FLEXIBLE SHAFT CO.)
Main Office: 4433 Ogden Ave., Dept. 114, Chicago 23, Ill.
New York Office: 322 W. 48th St., New York 19, N. Y.

Round Pot Furnace

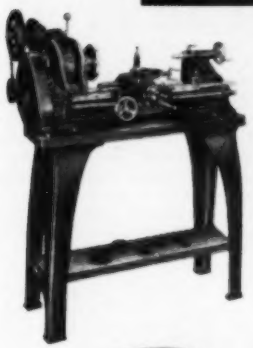


Melting Furnace

Bench Oven Furnace *Triple Purpose Combination "E"* *Triple Purpose Combination "D"* *Dual Combination*

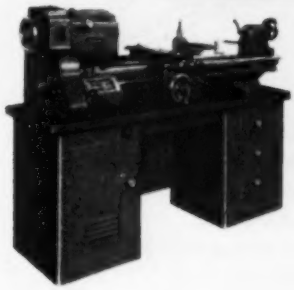
Atlas PRECISION TOOLS MEET SCHOOL NEEDS BEST!

10" LATHES



The only low-cost lathes with Timken tapered roller bearings; 16 spindle speeds; power cross and longitudinal feeds standard equipment. Greatest value by far for school shops.

CLAUSING 12" LATHES



Clausing 6300 and 4800 series 12" lathes have the power, precision, capacity, ruggedness to teach lathe fundamentals with maximum thoroughness. Timken bearing equipped, quick-change gears, 12¾" swing over bed, 24" — 36" — 48" between centers.

Atlas Metalworking Tools

Atlas metalworking tools are today's best school shop buys! *They're priced as low or lower than any comparable on the market* — yet give you more outstanding precision features (many of them Atlas "exclusives") for a lifetime of *accurate, dependable shop service.*

You'll appreciate their extra heavy, rugged construction, fine precision bearings, simplified operation, and exceptional versatility. Atlas tools help students learn quickly and get a broader understanding of the basic machining principles.

When you make up your equipment requisitions this year, keep *low-cost industrial quality* Atlas tools in mind. Send for the latest catalog.

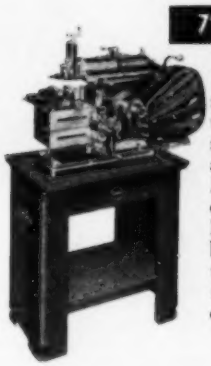
CLAUSING 18" DRILL PRESS

New, heavy-duty drill with many exclusive features for broad and thorough instruction. Drills to center of 18¼" circle. Capacity, ¾" in steel, 1" in cast iron — 6½" spindle travel.

DRILL PRESSES

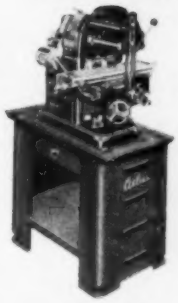
15" floor and bench models include new operating and durability features. 4 ball bearing "floating drive" for long accuracy life. Extra-heavy head, table, column, base. New depth control stop. 12¾" bench size also available.

7" SHAPERS



The only compact shapers with all the sturdy construction and operating features of large shapers, built down to size. Timken tapered roller bearings. Crank type ram drive. 4 speeds, 5 automatic cross feeds.

MILLING MACHINES



You can instruct in all milling operations with Atlas millers. Timken bearings, 8 spindle speeds — 62 to 2870 rpm. Back-geared power. V-belt drive. Only low-cost miller available.

ATLAS PRESS COMPANY

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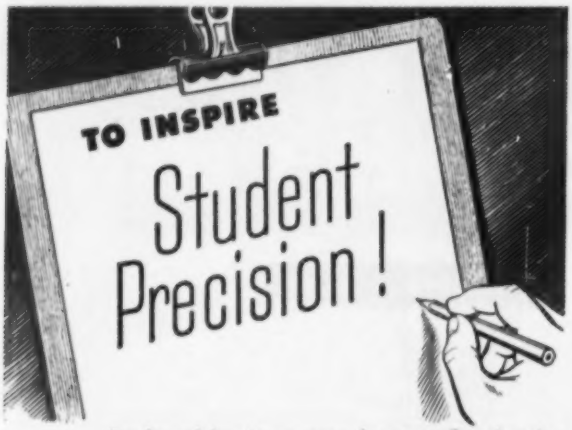
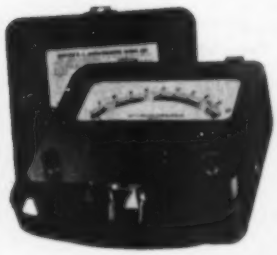
Atlas DEPENDABLE QUALITY TOOLS SINCE 1911



Preferred by instructors because they inspire students to new achievements . . . WESTON instruments also are the choice of practical administrators because their ruggedness and year after year dependability make their cost remarkably low! Ask for bulletin listing all instruments.

WESTON Electrical Instrument Corporation,
614 Frelinghuysen Avenue, Newark

For Advanced Requirements MODEL 622



Ultra sensitive instruments of the double pivoted type requiring no leveling when used in horizontal position. Combine high accuracy and a 6.1 inch scale . . . ideal for precise measurements of potential and current at very low energy levels. Available as d-c voltmeters, millivoltmeters, milliammeters and microammeters; electrolysis volt-millivoltmeters and high resistance voltmeters—also as a-c rectifier type instruments and as thermocouple ammeters, milliammeters and voltmeters.

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A clamp-on volt-ammeter built to Weston standards of safety, accuracy and dependability. Five full scale a-c current ranges of 1000/250/100/25/10 amperes with range overlap. Three self-contained a-c voltage ranges of 700/350/175 volts—insulated for 750 volts. Has convenient 6 position switch easily operated by thumb—adjustable pointer stop facilitates measuring starting current of motors.

WESTON

WESTON *Instruments*

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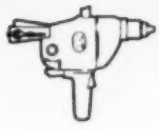
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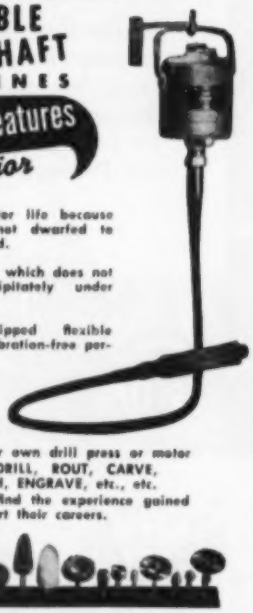

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New 16″ and 14″ Band Saws by WALKER-TURNER

For school shops, where neither the capacity nor expense of heavy industrial machines is warranted, and where a "hobby machine" would be just as impractical, Walker-Turner has engineered a special class of *light-heavyweight* Band Saws.

Professional in design and operation, yet *light* for production machines, the Walker-Turner Light-heavyweights give the industrial arts and vocational school the needed accuracy, range of speeds, and ease of handling for student training, without the necessity of heavy investment.

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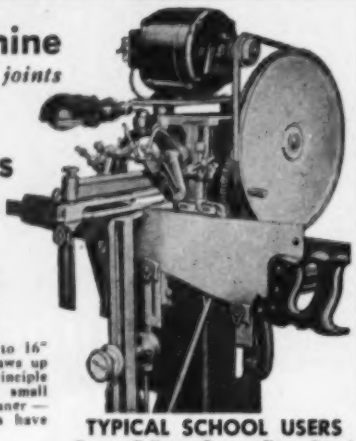

The Foley Saw Filer is ideal for sharpening saws used by students in school shops. It keeps them in tip-top shape, faster and better than by hand filing. Used by Army, Navy, hundreds of manual training departments and industrial plants. The Foley is the only machine that files and joints all hand, back and mitre box saws from 3 to 16 points per inch, crosscut circular saws up to 16" diameter (24" optional), and band saws up to 24' long. Patented jointing principle automatically evens up large and small teeth, so saws cut faster, truer, cleaner — stay sharp longer. Foley filed saws have less breakage and last longer.

30-DAY TRIAL OFFER

You may have the privilege of using the Foley Saw Filer in your own shop for 30 days. Write or send coupon for details and list of school users.

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Please send full information on 30-Day Trial Offer and list of school users of Foley Saw Filers.

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School.....

A Message to Ceramic Teachers

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Harper

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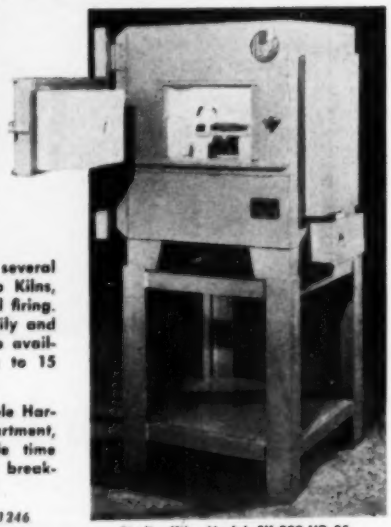

FOR SCHOOL PRODUCTION FIRING

Shown above is one of several versatile Harper Electric Studio Kilns, built to withstand heavy school firing. They fire all type of ware easily and safely up to 2500° F. They are available in several sizes from ½ to 15 cubic feet capacity.

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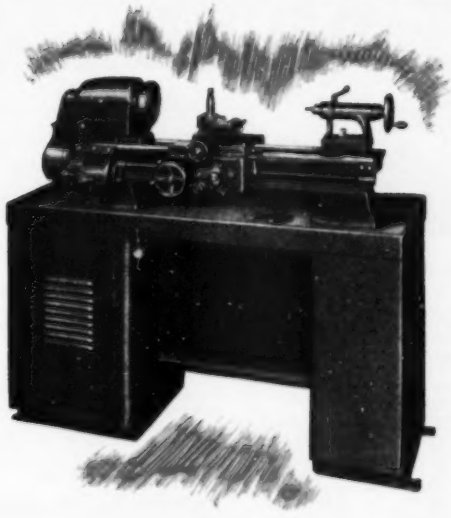

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11" Swing, 1" Collet
Capacity, 1⅜" Spindle Hole

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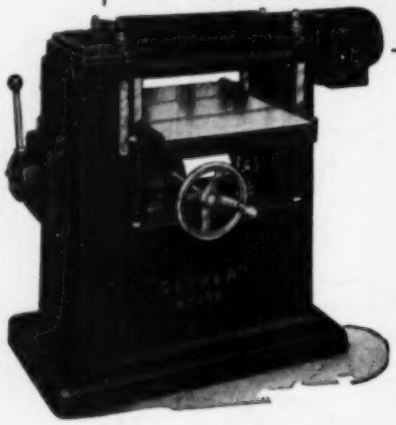
18-INCH
Single Surface Planer



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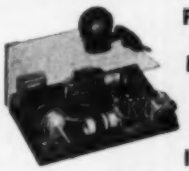

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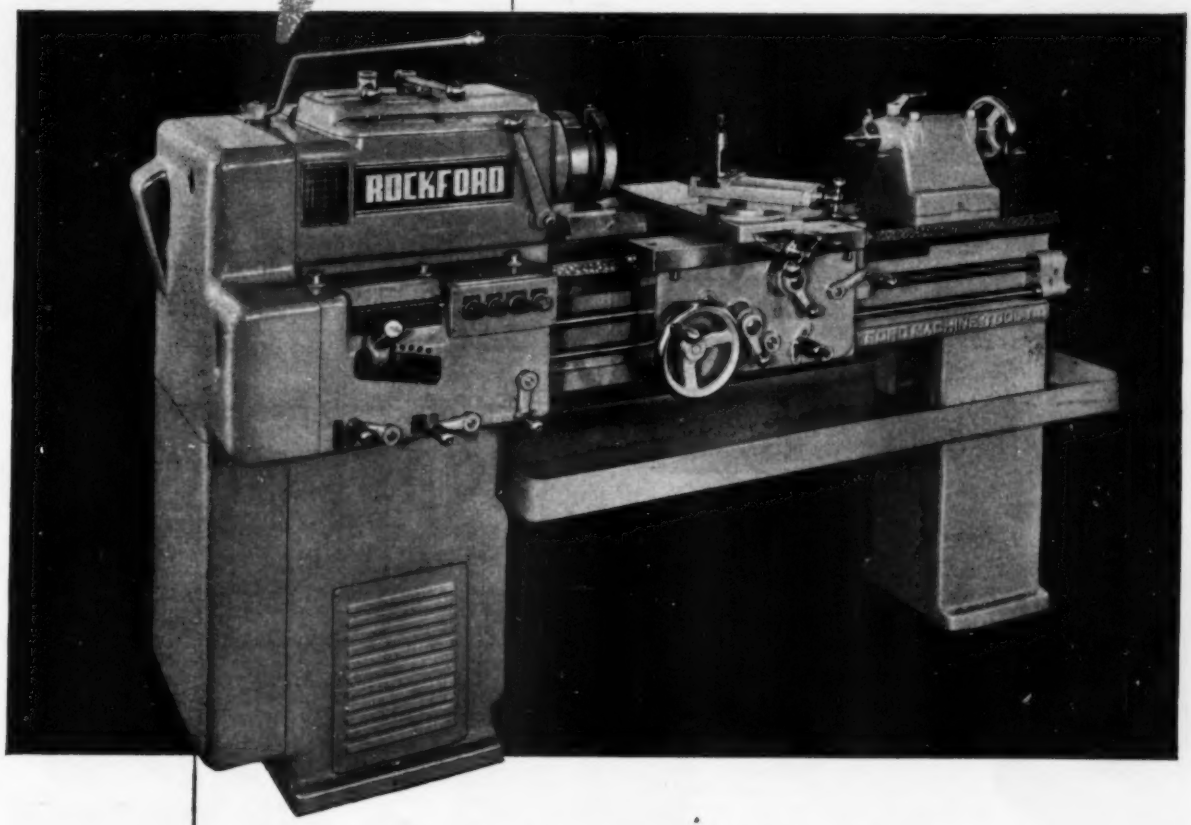
HEAVY CUTS, 16" OR 18" SWING, 30" CENTER DISTANCE
6' BED, DOUBLE-WALL APRON, 3100 LBS. TOTAL WEIGHT

either tool room or high production



Rockford Lathes offer you all of these production features, with modern design, ample dimensions and high quality materials.

Ask a Rockford Machine Tool Co. Representative to give you full details on the practical production advantages of these heavy service, medium sized, economy priced machines.

MEDIUM-SIZED
ECONOMY-PRICED

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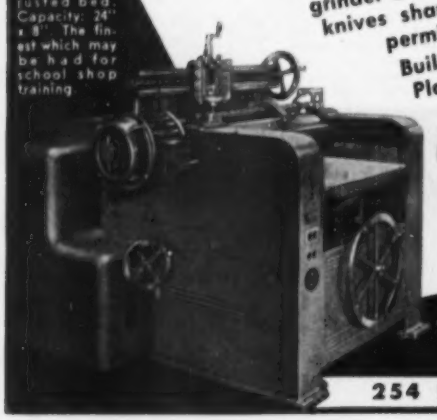

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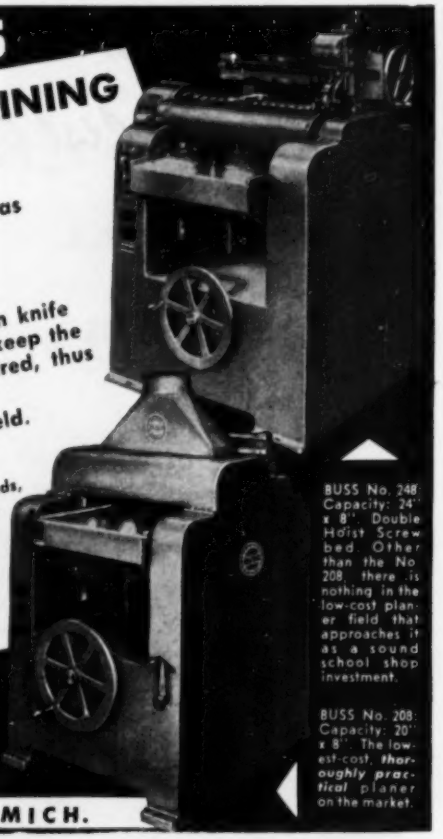

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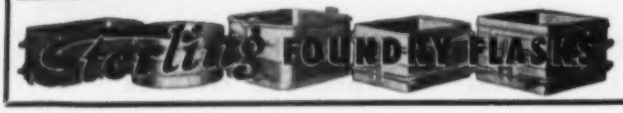

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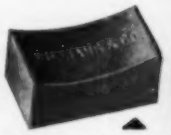

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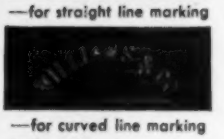

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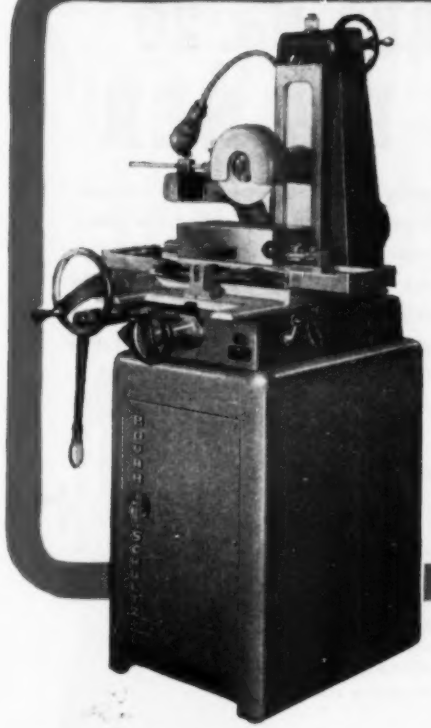

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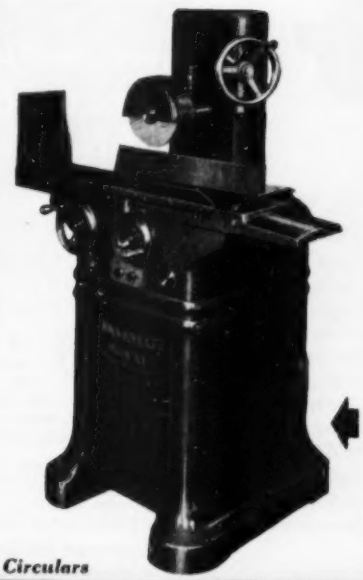

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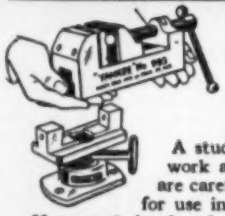

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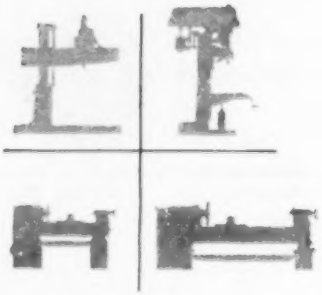

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INDUSTRIAL ARTS and VOCATIONAL EDUCATION

MAY 1953

Evaluating and Reporting Industrial-Arts Pupils' Progress

ARCHIE E. THOMAS
Public Schools
Ophir, Ore.

Evaluation is the process of gathering and interpreting evidence regarding the progress and problems of pupils in achieving desirable educational objectives.

The assigning of marks in the process of reporting is but one aspect of evaluating the total growth of an individual pupil.

In this study the author has attempted to show the consensus of opinion of experts in grading students taking industrial arts.

The questions that confront industrial-arts teachers who want to grade their students, are:

1. What are we going to grade in industrial arts?
2. When to grade?
3. What is an efficient method of grading?
4. What tests to use?
5. Of what use are progress charts?

What are we going to grade? Fred Short,[1] at the University of Wisconsin, made an exhaustive study of expert opinions in 1931, and he finally settled on a grading chart with the following points to be graded:

1. General appearance, neatness, and finish.
2. Accuracy of measurement.
3. Speed.
4. Knowledge of related materials.
5. Interest, co-operation with others, ability to solve new problems.

Fred Short's chart is made out for seven different activities and the value of these five items vary in the different activities. To simplify matters, we will take woodwork.

The first three factors mentioned are manipulative processes, and Short has placed values on them as follows: (1) 31 per cent, (2) 21 per cent, (3) 11 per cent or approximately 65 per cent. On knowledge of related materials he placed a value of 14 per cent. On the fifth, which might be classed as attitudes, 25 per cent.

Wilber[2] has classed the things to be evaluated about the same, but he has not put any definite value on any of them.

Ericson[3] says, "There is a limit to the number of desirable factors to be given attention." He has chosen the following:

1. Quantity of work accomplished (speed) — 25 per cent.
2. Quality of work (accuracy and workmanship) — 25 per cent.
3. Effort put forth — 20 per cent.
4. Knowledge acquired and applied — 20 per cent.
5. Attitude — 10 per cent.

As may be noticed, he allowed 70 per cent for manipulative processes. Short's chart allowed 63. Ericson allowed 20 per cent for knowledge acquired and applied, while Short allowed only 14. Short allowed 23 per cent for attitudes while Ericson allowed 10.

It seems then that experts are quite in agreement on what the five most desirable factors to be graded are. Also on the value to be placed on the three that come under the head of manipulative processes.

The assumption is then, that the points to be allowed on the other two factors will be in proportion to the emphasis placed upon them in your particular course of study, with the assumption that these five factors are the all important factors to be graded. In what follows they are classified under the following heads:

I. Manipulation
   - *a*) Speed — There is a need to recognize that success on many jobs depends upon ability to produce, and that speed within reasonable limits does not impair the quality of a good worker.
   - *b*) Quality — Accuracy, workmanship, neatness of appearance and finish.
   - *c*) Effort put forth — Some pupils may put forth much effort, and still not be as successful in producing fine work, as some other fellow who has put forth much less effort.

These factors can be graded on the job.

II. Related Information
   - *a*) Knowledge of materials and tools.

[1] This chart is shown on page 171 in Friese's "Course Making."

[2] *Industrial Arts In General Education*, Gordon O. Wilber.

[3] *Teaching Industrial Arts*, Emanuel E. Ericson.

b) Knowledge of related industries and products.

III. Attitudes (success qualities)

a) Interest, co-operation with others, habits, and the like.

When to Grade?

Many instructors grade by project, that is when the project is complete. Experts do not all agree on this.

Ericson, in his "Teaching Industrial Arts" says, "This method is effective, if the project does not involve more than one or two days' activity. The more frequent these periods, the more data will the instructor have, and the more interest will there be in the class."

Other instructors grade chronologically. Grading is done daily, twice weekly, weekly or monthly, regardless of the type of work being done. This system in my opinion is the better, because it puts a continued stress on the manipulative processes and attitude.

Some instructors grade at progressive intervals as:

1. Getting out rough stock.
2. Laying out.
3. Mortises and tenons, and so on through the progressive steps in making the project.

This method is better than the first one mentioned because often a job that may be rated *very good* up to the point of finishing, is spoiled by the finish.

What Are the Characteristics of an Efficient Grading System?

The following are listed by Ericson:

1. It should consume a minimum of teacher's time.
2. It should be based upon a wide scope of student responses and attainment.
3. Grading should be frequent.
4. A uniform standard for grading should be applied.
5. Students should have access to their grades.
6. Grades should be made permanent.

An illustration of a grade card is shown, which answers well for grading the manipulative processes and attitudes.

This card is taken to the pupil, either daily or twice weekly, or if you prefer grading the project it would be taken at the time the project is completed, and let him assist in grading himself.

Why Have the Pupil Assist in the Grading?

One good reason is that it removes the mystery of grading and eliminates argument. Checking for good workmanship and scoring for commercial acceptance are activities that contain definite training values.

Twenty points are allowed for speed, 25 for accuracy and workmanship, 10 for effort, 20 for attitude, and 25 for related learning.

The grading of related learning depends on how you teach. Assuming that we allow 25 per cent of our class time to related learning, or we use 15 minutes every day for this, we could grade some one day and some the next. If we use one day a week for this, grading might be done on that day.

I prefer to let the chips fall where they may. If the opportunity arises, whether it is the day or time originally planned for such learning, I try to take advantage of the opportunity. Much depends on the class, some have to be motivated and others don't. When some question arises within the group, make assignments then for reports. If a field trip is made, discussions on different phases of the industry are held the next day. This generally brings up many questions that need further study and reports are assigned.

Do not enter a grade for related learning on these reports, but make a notation on the effort and attitude section of the card. It is well to give three tests and one final examination during the nine-week period, and then grade the related learning from them.

Tests are usually briefer and of intermediary character as compared with examinations.

Many very excellent standardized and some unstandardized tests in industrial subjects are available from a number of publishing houses. The tests that are best suited to your course of study are the ones to use.

It is the opinion of experts that testing

THE GRADE CARD

Name	*A*	*B*	*C*	*D*	*E*
Speed	Most rapid 5% 20	Accomplished more than average. 17.5	Average 15	Slow 13	Very slow Below 13
Accuracy and workmanship	Among upper 5% Handles tools expertly. 25	Above average Handles tools with considerable skill. 22.5	Handles tools with some co-ordination and rhythm. 20	Careless Below average 17	Slovenly Slipshod Below 17
Effort	Supreme effort 10	Above average 8.5	Average effort 7	Below average 6	Lazy Below 6
Attitude	Observes all safety rules. Co-operates. Takes good care of tools. 20	Co-operates Prefers sharp tools. Does required work. 17.5	Co-operates quite well, does required work with urging. 15	Never sharpens tools, careless about safety. Damages tools through carelessness. 13	Uses tools carelessly. Tries to get by with little work. Below 13
Total	69–75	62–68	55–62	45–54	Below 45
Related learning					
Total	93–100	87–92	80–86	70–79	Below 70

is the best way to obtain a grade for related learning.

There are two more advantages in the use of the grading card. The boy's name is on it, and when you go to him you call him by name. This has a psychological effect — boys desire recognition. It also aids you in learning his name.

You explain the card to the boy, and let him suggest where he rates, make a small pencil mark in the section indicated. For illustration let us assume in speed he thinks he is average, put a check in the section for speed, and so on through the rest, then you add them up and check the total in the column in which he falls. Later the shop foreman, or if you have a shop secretary, can transfer them to the progress sheet, like the one shown.

Why Measure Progress?

In the first place, the administrator wants a grade at the end of a certain period. The progress sheet eliminates any guessing. If John has any question about his grade, his record will speak for itself.

Progress Sheet for *John Doe*
Beginning *9/10/51*
1st nine weeks Ending *11/10/51*

Date	*Speed*	*Accuracy and Workmanship*	*Effort*	*Attitude*	*Total*	*Weekly Average*	*Tests*	*Final Grade*	*Letter Grade*	*Remarks*
9/12/51	15	17	6	17.5	56					
9/17/51	15	20	7	17.5	60	58				
9/21/51	15	20	7	17.5	60					
9/23/51	15	15	6	13	49	55	23	80	C	Very poor attitude

Four other reasons for measuring progress of pupil in shopwork:

1. To ascertain the degree of advancement made by the pupil.
2. To learn of the difficulties experienced by the student.
3. To motivate learning process.
4. To measure teaching efficiency, as another technique in teaching.

At the end of the year the final grade should be put on a permanent record card. The permanent record card should show more than his grades, it should tell just what the course covered, and everything that was revealed about the boy, including his aptitude, habits, personality, and other traits.

Virginia Tech's Radio Script on Industrial-Arts Education

JOSEPH A. SCHAD
Associate Professor and Head of Industrial Arts Education

RUSSELL G. LOUIS
Associate Professor, Industrial Arts Education

WALTER L. GRIGGS
Assistant Professor, Industrial Arts Education
Virginia Polytechnic Institute
Blacksburg, Va.

Of the many media for telling the school's story to the public, radio, and television are unquestionably the best informants. What does one do when radio time is readily available? Here is what the staff of three in the Department of Industrial Arts at Virginia Polytechnic Institute did for its first radio program which was broadcast over the facilities of the campus station WUVT and that of WDBJ in Roanoke on November 20 at 12:30 p.m. The description of what was done and the ensuing script are presented in the hope that it will help others in the field of vocational and industrial-arts education plan effective radio programs.

In anticipation of the day on which the broadcast would be made, the staff agreed that several planning and rehearsal conferences would have to be held and that the radio program should not be a one-man undertaking or a one-man presentation. It was further agreed that the radio program would be planned and carried out in a democratic manner. While the approach required many hours of planning and preparation, much more than if one person had done it, the staff felt, upon completion of the work, that it was good experience for all to have some responsibility for the program and to share in the planning.

The first step in planning the radio program was to formulate objectives. After considerable discussion it was unanimously agreed that the following objectives would serve to give direction to the program:

1. To present information which will serve to encourage young folks to pursue industrial-arts teaching as a career.
2. To promote programs of industrial arts in Virginia schools.
3. To publicize one of the teacher training services rendered by Virginia's Land Grant College.
4. To stimulate an interest in the school's industrial-arts activities.
5. To enlighten the public relative to the purposes and goals of industrial arts as a school subject.

Next the staff reached the decision that the radio program would be in the nature of an interview. Such a program would call for a series of questions by the radio announcer and these in turn would be answered by members of the staff.

To obtain the questions each member of the staff prepared a set of questions which stemmed from the objectives pre-

viously established for the radio program. This being done, a conference was held at which time all questions were reviewed and analyzed. Approximately two thirds of the questions were eliminated because the 12 minutes available for the presentation were inadequate for a discussion of all the questions, and because, in many instances, the questions, as one would expect, overlapped in thought. The questions which were finally selected represented some of the original statements plus a few that were modified. It seemed quite probable that the 11 questions which were selected could be asked and answered within the time limit, but not being certain, the last three questions were phrased so that the answer to any one of the three might serve as an appropriate termination point for the interview. Later, this step proved to be unnecessary. Each of the three staff members then took a set of the selected questions and prepared, in his own words, appropriate responses. These were then examined and modified by the staff to incorporate the best thinking of the group. One of the main reasons for writing out the responses was to get some idea as to the length of time it would take to answer the questions. Another was to insure full coverage of the question.

The next step was to determine which staff member would answer certain questions. This resulted in a distribution of questions which was approximately equal. With prepared responses as a guide the staff member, upon being asked a question, was expected to answer a given question in his own words.

Several preliminary rehearsals were then held and this proved to be time well spent. During the first rehearsal only one half of the questions were answered in the allowable 12 minutes. Considerable improvement occurred in the second practice period and by the time the staff had gone through the questions three times it was found that the 11 questions could be answered in the allotted time. In the actual broadcast, a tape recording made an hour before it went on the air, the announcer had sufficient time to ask two additional questions. A total of 13 questions were, therefore, answered by the staff.

With the exception of the introductory and concluding remarks the script which was entitled "Industrial Arts Education at Virginia Tech," consisted of the following questions and answers:

INTERVIEWER: What is the chief purpose of the Virginia Polytechnic Institute's industrial-arts education curriculum?

FIRST STAFF MEMBER: Well, Bob, there is actually only one purpose and that is to prepare persons, who are interested in teaching, for positions as instructors of industrial arts in Virginia schools. Graduates of our four-year curriculum receive a bachelor of science degree in industrial-arts education and are qualified to teach industrial-arts subjects in grades 7 through 12. In other words the program's chief purpose, Bob, is to serve those who are primarily interested in the field of industrial-arts teaching.

INTERVIEWER: You mentioned industrial-arts subjects. Just what do you mean by industrial-arts subjects?

FIRST STAFF MEMBER: Like language arts and social studies, it has reference to a broad category. Some examples of industrial-arts subjects are drawing, electricity, printing, transportation, manufacturing, woodworking, metalworking, textiles, ceramics, plastics, silk screen process printing, jewelry, radio and electronics, leatherworking, and the like.

INTERVIEWER: In the schools served by your graduates, what is the general purpose of industrial arts? Does it aim to prepare boys and girls for a trade?

FIRST STAFF MEMBER: Contrary to a belief which is quite prevalent, industrial arts in our schools does not prepare boys and girls for trade pursuits. The program which achieves that goal is the trade and industrial or the vocational-industrial education program. Industrial arts is not a trade training program nor is it a special subject field. Rather, it is an essential part of the program of general education. In fact, industrial arts is a phase of general education which seeks to give all boys and girls, regardless of career choice, an understanding of American industry, its problems, processes, materials, tools, machines, and organizational structure. By problems are meant those facing labor, management, and society as a whole.

Foundry at Murrell Dobbins Vocational-Technical School at Philadelphia, Pa.

Mr. Edward Saks, instructor, with two students. Students have won many awards for craftsmanship. — Benjamin J. Novak, Murrell Dobbins Vocational-Technical School, Philadelphia

In the industrial-arts laboratory where much of the work is carried on, boys and girls conduct experiments, as well as design and construct useful projects involving the working of metals, woods, clays, plastics, and other industrial materials. In addition to these activities, pupils make studies and visit industries, thereby developing a rather complete picture of American industry.

The experiences gained through a study of industrial arts have many values for boys and girls. For some, industrial arts provides opportunities for adolescent youngsters to try out and explore many occupations. The work uncovers latent abilities, aptitudes, and interests. Thus, for some boys and girls, industrial-arts activities serve as an orientation experience. For others, the work offers opportunities to develop hobbies or recreational pursuits. For all boys and girls, industrial arts has consumer or economic values. The very fact that youngsters, through industrial arts, learn how to do things with their hands, makes for social and economic competence around the home. In addition, youngsters learn how to select, care for, and use, intelligently, the materials and products of American industry. The emphasis here is on the things that individuals buy for the home and for personal use. Other industrial-arts values center around health and safety, aesthetic appreciations, and desirable social habits and attitudes. Industrial arts, then, is general education not vocational education.

INTERVIEWER: Do all the schools in Virginia offer industrial arts?

SECOND STAFF MEMBER: No, not all the schools in Virginia offer work in the area of industrial arts. Above the sixth-grade level the work is offered in practically all city school systems, while in the counties, slightly more than one half have programs of industrial arts. In the state there are approximately 250 industrial-arts teachers, more than half of whom are in city school systems. In the nation, according to one authority, there are approximately 40,000 teachers of industrial arts. The importance of the work can readily be visualized when it is recognized that more than 200 colleges across the land prepare teachers for this field of work.

INTERVIEWER: What is the employment outlook in this field of teaching in Virginia?

THIRD STAFF MEMBER: As in most teaching fields, the employment outlook is especially good. This is not only true in Virginia but equally true in most other states. Last year, for example, after all available graduates of our institution had been placed, we had, just prior to the opening of schools in September, a list of some thirty unfilled positions in the state. At the present moment, at least 15 of these school departments are without instructors and others are operating with emergency personnel. For normal personnel replacement purposes alone, Virginia needs from twenty to forty new instructors each year and this estimate does not include the number of people needed to staff new departments. One thing is certain, and that is, that we need many more teachers of industrial arts than we now have in training. The employment outlook for some years to come looks especially good in the field of industrial arts.

INTERVIEWER: What are the opportunities for advancement or promotion in this field?

THIRD STAFF MEMBER: Well, Bob, classroom instructors in this field advance in two directions. Some are promoted to responsible positions in the field and occupy such important posts as department heads, local and state supervisors, directors, coordinators, and principals of technical schools. Others move into the general area of school administration and assume positions as high school principals, school superintendents, and directors of instruction. Still others go into industry and assume positions as plant training directors and supervisors of training. Opportunities for teachers of industrial arts to advance to positions carrying increased responsibilities are especially good.

INTERVIEWER: Is industrial-arts teaching restricted to men?

SECOND STAFF MEMBER: No, Bob, it is not. While we at Virginia Tech do not prepare teachers for elementary school industrial arts, we should like to point out that practically all the instructors of industrial arts at this level are women. Now and then we find men who are special resource persons doing elementary school industrial-arts work. At this level there seems to be a trend toward using more men. In junior and senior high school grades one finds both men and women, the vast majority, of course, being men. The field of industrial-arts education, however, is one that girls might well consider and pursue.

INTERVIEWER: I understand that you have a number of graduates serving schools in Virginia. How many are there in South West Virginia?

THIRD STAFF MEMBER: Yes, Bob, we have graduates of our department in all sections of Virginia. In South West Virginia there are seven men.

INTERVIEWER: I think it would be interesting to mention the names and locations of these men.

THIRD STAFF MEMBER: Well, in Roanoke we have at Jefferson High School, Clinton Kersey and Albert Folden; at Woodrow Wilson Jr. High School, Paul Plott and Lynn Slonaker; and at Monroe Jr. High School, Wallace McMillan. In Wytheville at Wytheville High School, Kenneth Dawson and at Pulaski High School in Pulaski, Fred Spracher.

INTERVIEWER: Are scholarships available for persons who wish to qualify as teachers of industrial arts?

SECOND STAFF MEMBER: Yes, the state grants a few scholarships to persons who wish to pursue industrial arts teaching as a career. Information concerning scholarships may be obtained from the college or from your local superintendent of schools.

INTERVIEWER: For persons who are interested in pursuing industrial-arts teaching as a career, do you have any literature that is readily available?

FIRST STAFF MEMBER: Yes, we do, Bob. Besides the college catalog which presents the general admission requirements and the four-year curriculum, we have available a publication entitled, "Industrial Arts at Virginia Tech." This bulletin gives a rather complete picture of the work that teachers of industrial arts do and answers some of the questions frequently asked by interested students. A copy of the publication may be obtained by writing to the Public Relations Office of the college.

Correction

Much to our dismay the answer *J* in the mechanical drawing test on page 43 of the February issue was allowed to go through as 180°, when it should have been 135°.

Petroleum power and petroleum derivatives enable the American farmer to keep ahead of the constantly increasing demand for food. This is extremely important because our population is increasing at a rate of 7000 persons a day. — *Petroleum Newsnotes.*

Related Science for Apprentices

ALFRED S. DREW
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Many of us who are involved in apprentice training programs probably agree that the primary objective of apprenticeship is to turn out a skilled worker with a good understanding of the technical principles and practices of the trade. Many of us would further agree that to achieve this objective, the ideal teaching situation would be individual instruction tailored to the needs of each apprentice and based upon an analysis of each trade. However, anyone acquainted with administrative problems in the smaller vocational schools is aware of the burden that is placed upon the staff in attempting to provide instruction for a heterogeneous group of potential tradesmen. It is unlikely that an instructor can be provided for each trade represented in the school.

Several years ago, this writer was assigned to provide related science instruction to a heterogeneous group of apprentices from the Milwaukee-West Allis, Wisconsin area. He attempted to provide individual instruction. Work was begun on the organization of a science course for each trade represented in the class (varying from 15 to 22 trades). Organized material, suitable for individual instruction, was not readily available. As class loads increased and differences in students' backgrounds and abilities became more pronounced, such a task became difficult, especially for one not thoroughly familiar with all the trades represented. A possible solution to the problem was a suggestion that there probably were fundamental science principles (concepts) or science topics that were common to many trades. Assuming this to be true, could a sufficient number of these principles or topics be identified to warrant a general course of study for a majority of the apprentices: metal trades workers, production electricians, foundry workers, sheet-metal workers, welders, and railroad repairmen? The writer attempted to investigate this problem, limiting his study, for the time being, to the possible identification of suitable science topics.

Procedure

Shop instructors and apprentice supervisors in industry were contacted and asked to submit topics which, if taught in a related science course, would give an apprentice a better understanding of the principles and practices of his trade. This writer reviewed trade technology texts and the few available trade science books for additional topics. Topics common to several trades were placed on a tentative list. When possible, the phraseology or wording of the tentative topics was made to conform with those commonly listed in science and technology texts. The writer hesitated to include some suggested topics because he felt that they were to be classified as technology. At times, the distinction between trade science and trade technology seemed obscure. However, it was decided to include such questionable topics on a rating scale so that the group to be surveyed would have an opportunity to indicate whether they properly belonged in a group science course for industrial apprentices.

A rating scale containing 72 suggested science topics was developed and sent to educators, members of industrial training staffs, and tradesmen (local and national coverage). The personnel surveyed were asked to rate each topic as *Very Valuable*, *Valuable*, *Of Some Value*, and *Unnecessary*. The writer then arbitrarily assigned a point value of three, two, one, zero, respectively to these ratings. When the returned scales were tallied, the science topics were listed in a table, and marked therein according to the total number of points with which each topic was credited, the one having the greatest number of points being ranked first.

The rating scales were distributed and returned as follows:

Group Surveyed	*Distribution*	*Returns*	*Per Cent Returned*	*Rating Scales Completed*	*Per Cent Returned & Completed*
Educators	35	29	82	25	71
Training staffs in industry	47	28	59	27	57
Tradesmen	22	16	72	16	72
Total	104	73	70	68	65

Even though a 70 per cent response was attained, only a 65 per cent satisfactory return was realized, for five individuals failed to properly complete the rating scale.

Findings

The responses of all personnel who rated the topics were summarized in the data in Table I — Total Points and Rank of Science Topics for Apprentice Groups as Determined by 68 Educators, Industrial Training Staffs, and Tradesmen.

The Rank Differences Method of Correlation, when applied to the *ranking* of the science topics by each of the three groups surveyed, supplied the following correlation data:

Groups Surveyed	*Correlation*
Educators and industrial training staffs	+ .536
Educators and tradesmen	+ .512
Industrial training staffs and tradesmen	+ .589

These figures indicate some, but certainly no significant amount of correlation or agreement in the ranking of the topics by the three groups surveyed.

Conclusions

1. It appears that suitable science topics can be identified from Table I for presentation to a mixed group of industrial apprentices. However, precautions must be observed in interpreting the results, because

of limitations placed upon ratings of topics by the personnel surveyed: the topics are not co-ordinate (some are more comprehensive than others); there was lack of knowledge of the full content of each topic; what was considered *Very Valuable* for one or two trades was *Unnecessary* for others; some personnel desired to know the time available, and the other related courses in the program. Nevertheless, Table I can be of value when utilized to identify science topics which should probably be eliminated from consideration for group presentation to apprentices.

Table II — Science Topics Recommended for group instruction of industrial apprentices at the West Allis School of Vocational and Adult Education is suggested as a basis for organizing a guide line for a group course. Topics may be added or deleted as required. Schools which have a very limited related technology program may desire to include some of the technology units included in the 72 topics in Table I, that is, technology topics which received high ratings.

2. Though some positive correlation between the ratings of the science topics by educators and men in industry was evident, a higher degree is desirable. Will industry have to take the initiative in suggesting principles to be learned to insure trade competence of its apprentices?

3. A study of the *remarks* made by personnel surveyed, led the writer to seriously question the *science topic* approach to the problem of instruction for a mixed group of apprentices. Perhaps a study based on scientific principles or concepts may be a better approach.

4. A further analysis of the *remarks* indicated disagreement among the personnel surveyed on fundamental issues, such as the objectives of science education for apprentices, the methods of presentation, the materials to be covered, the time to be allotted for related instruction, and others. The need for clarification of these issues is evident. Probably the significance of this study lies in the array of problems it has suggested for further investigation. Issues which were viewed as local problems were found to be common to educators and men in industry in other sections of the country:

a) Should science be included in a program of related subjects for apprentices? If so,

b) What are the objectives of a related trade science course for apprentices?

c) A survey of organized science curricula for apprentices will readily disclose a gross abuse of the term *science*. Technological and shop subjects are prevalent in

TABLE I. Total Points and Rank of Science Topics for Apprentice Groups as Determined by 68 Educators, Industrial Training Staffs, and Tradesmen

Topic	Rank as Determined by: Educators	Ind. Trg. Staffs	Tradesmen	Total Points
Metals for industrial use	11.	6.5	1.	170
Lubrication	2.	6.5	6.5	169
Precision measurement	5.5	6.5	3.5	168
Alloys: Preparation, properties, uses	8.5	15.	2.	164
Health and hygiene in industry	5.5	18.5	11.	159
Levers, pulleys, wheel and axle	5.5	18.5	15.5	158
Inclined plane (threads, dies, taps)	3.	11.5	31.	158
Systems of Measurement: English and Metric	1.	32.5	31.	154
Abrasives	19.5	18.5	6.5	154
Gears	8.5	18.5	31.	153
Properties of materials	19.5	11.5	23.	153
Theory of machines	11.	27.5	15.5	152
Electric currents and circuits	16.	25.5	6.5	152
Testing and strength of materials	16.	23.	15.5	151
Shop Practices: Metal forming methods	47.5	1.5	19.	151
Shop Practices: Treating and finishing	42.5	1.5	23.	151
Generators and motors	22.5	23.	11.	150
Electrical equipment	25.5	15.	19.	149
Science in Industry: An introductory topic	16.	27.5	23.	147
Protection of metal surfaces	28.	21.	11.	147
Shop Practices: Metal removal methods	50.5	6.5	19.	147
Machines and friction	13.5	25.5	36.5	146
Bearings and bearing materials	19.5	23.	31.	146
Shop Practices: Metalworking and forging methods	42.5	4.	36.5	146
Shop Practices: Fabricating	37.	3.	47.5	146
Power transmission	19.5	15.	52.	145
Heat	5.5	44.	3.5	144
Magnetism	11.	40.	23.	141
Alternating currents and electrical coils	27.	30.	23.	140
Shop Practices: Research development, engineering	57.	13.	11.	140
Shop Practices: Molding	47.5	9.5	58.5	137
Shop Practices: Casting	42.5	9.5	65.	135
New materials in industry	52.	34.	6.5	133
Analysis of metals	47.5	37.5	11.	131
Metal cleaning methods in industry	37.	40.	15.5	131
Energy	13.5	36.	65.	130
Shop fluids	30.	42.	31.	126
Motion	24.	37.5	63.	126
Compound machines	42.5	35.	52.	125
Analysis of forces	33.	40.	47.5	125
Light in industry	33.	46.5	26.5	124
Materials handling	61.5	30.	36.5	124
Electricity at rest	30.	44.	41.5	123
Shop Practices: Metal deposition methods	59.5	30.	47.5	123
Hydraulics in industry	30.	44.	55.5	120
Electronics in industry	37.	49.	47.5	118
Chemical Principles: Oxidation and reduction	22.5	59.5	41.5	116
Engines	42.5	49.	55.5	115
Pumps	37.	46.5	67.5	112
Heating methods in industry	57.	51.	41.5	111
Chemical Principles: Physical and chemical changes	25.5	61.	55.5	110
Gases used in industry	47.5	57.	41.5	109
Properties of gases	42.5	62.	36.5	106
Use of plastics in industry	65.	52.	31.	105
Optical tools	50.5	55.5	61.	104
Use of wood in industry	68.	49.	41.5	104
Use of rubber in industry	66.5	53.5	26.5	103
Chemical Principles: Elements, compounds, mixtures	33.	63.5	61.	100
Use of glass in industry	66.5	55.5	31.	100
Properties of liquids	37.	59.5	71.	97
Chemical Principles: Common elements and their compounds	57.	63.5	47.5	96
Fuels for industry	61.5	58.	61.	96
Brakes in industry	63.	53.5	67.5	96
Sound in industry	54.5	65.5	41.5	96
Chemical Principles: Acids, bases, salts	53.	70.	55.5	90
Color in industry	54.5	71.	52.	88
Inventions and patents	70.	67.5	58.5	78
Radioactivity: Industrial applications	69.	65.5	69.5	74
Chemical Principles: Solutions, colloids, suspensions	64.	72.	69.5	70
Atomic power for industry	72.	67.5	65.	70
Atomic theory	71.	69.	72.	67

TABLE II. Science Topics Recommended for Group Instruction of Industrial Apprentices at the West Allis School of Vocational and Adult Education

Topics	*Topics*
Metals for industrial use	Precision measurement
Alloys: Properties and uses	Theory of machines
Analysis of metals	Levers, pulleys, wheel and axle
Metal cleaning methods in industry	Inclined plane (threads, dies, taps, etc.)
Protection of metal surfaces	Gears
Properties of materials	Power transmission
Testing and strength of materials	Magnetism
New materials in industry	Electrical equipment
Mass production methods	Electrical currents and circuits (a.c. and d.c.)
Health and hygiene in industry	Generators and motors
Science in Industry: An introductory topic	Heat
Lubrication	Shop fluids other than lubricants
Machines and friction	Energy
Bearings and bearing materials	Motion
Abrasives	Analysis of forces
Systems of Measurement: English and Metric	

Topics
Chemical Principles: Physical and chemical changes
Chemical Principles: Oxidation and reduction
Chemical Principles: Acids, bases, and salts
Current Apprentice Program (approx. 576 hrs.; 8 hrs. per day over a two-year period)
TRADES: Machine trades, foundry, welders
RELATED SUBJECTS: Math., blueprint reading, science, technology, metallurgy (1½ hrs. each), apprentice problems (½ hr.)
* * *
TRADES: Railroad repair, sheet metal
RELATED SUBJECTS: Math., blueprint reading, science, technology, welding (1½ hrs. each), apprentice problems (½ hr.)
* * *
TRADES: Production electrician
RELATED SUBJECTS: Math., blueprint reading, science, technology for 3 hrs. (others 1½ hrs. each), apprentice problems (½ hr.)
NOTE: 1. Technology topics which received favorable ratings in Table I may be included in related technology courses.
2. Each topic listed should be supplemented by practical applications peculiar to each of the trades represented in a class.

science courses. Should an attempt be made to more clearly define and delimit trade science, technology, and related shop courses?

d) What qualifications are desirable for an instructor of related science for apprentices?

e) Can additional studies be made of the relative values of group instruction and individual instruction in related trade science courses for apprentices: (1) where all apprentices within a class are engaged in the same trade, and (2) where apprentices in a science class represent several trades?

f) Which of the following plans for apprentice related science instruction is most feasible: (1) a general science course — the same for all apprentices, or (2) a basic general science course for all, followed by a specific trade science course for each, or (3) a trade science course for each apprentice, based upon an analysis of his specific trade?

g) In the course of this investigation, the suggestion was offered to the writer that if the science teacher can establish a firm foundation in the fundamental principles of science, industry will provide for specific application as the need arises. Science applications now and in the future will differ, but the principles will be the same. Well then can we identify the very basic science principles upon which our greatest and most common trades and industries are founded?

Aiding a Poor Shop

WILLIAM J. LOUGHREY
Cincinnati, Ohio

How many industrial-arts teachers are faced with the grim outlook that their local board of education cannot afford to equip their shop with much needed hand tools and needed repairs on the power tools? As youngsters learn to use tools, some are careless and tools are broken. Because of the acute money shortage in some communities these tools are not replaced and, therefore, are lost for future instruction. The writer was confronted with this unhappy situation in his first year of teaching until he hit upon an idea.

The community in which he was teaching was a rural community. The sons of these farmers were students at his school. The shop set up was such that courses in beginning woodwork, and a second year of advanced woodwork could be offered. This meant a course of four semesters in nothing but wood and its uses. Forseeing the possibility of teaching the boys too much woodworking, he revised the old plan of home mechanics. He composed a letter which he sent to all the families of the community requesting that they send in all their broken furniture to be fixed by their children at a nominal fee to defray cost of materials and to aid the shop. The money earned would constitute an industrial-arts fund for repair of broken tools and the purchase of new machines. The idea went over enthusiastically. The Parent-Teachers Association got back of the project and canvassed the neighborhood for broken furniture. Soon the flow of broken chairs, card tables, and all other kinds of furniture became so great that the *white flag* had to be raised and the people had to be asked to hold off the jobs. It had come to the point where there was so much work that two classes could be kept busy with nothing but repair work.

Trying to combat this unforeseen incident, the senior boys were organized into a junior-executive unit to handle all repairs. They decided to allow two double periods a week to repair in each class and to schedule the work so the parents would know when they could expect to be taken care of. It was found that there was a

backlog of work that would last until the closing of school in June.

The writer believes firmly that the educational value of the revised course was double of what it had been before. About 90 per cent of the work that these boys will do in their home shops after graduation will be making repairs of some kind of work. They are learning to do this type of work at school and are helping to earn a better equipped shop for the boys that will follow.

One student who was a minor discipline case because of lack of interest was put in charge of the freshman class and has changed completely. He has taken on a new interest in school and likes to do this type of repair work.

One of our first jobs encountered was to repair a platform rocker almost 200 years old. It was a genuine antique. It came to us completely disassembled in a cardboard box. Now it has a new hand rubbed, varnished surface, leatherette covering to simulate *pony skin*. On this project alone the boys were shown the proper way to web, tie in springs, and upholster with leatherette.

Other jobs which have been completed have been kitchen chairs recovered, rockers reglued, card tables rejuvenated, and other items too numerous to mention. The prices are kept at bare minimum and our last treasurer's report shows us that we have enough money for a much needed band saw.

The idea described here is not new, but it is helping us to make our shop one of the best in the county, and it will soon be able to expand its curriculum beyond that of just woodworking, and enter into a much broader industrial-arts program.

The Industrial-Arts Teacher as a School Placement Officer

HERMAN T. SCHWARTZ
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An area in which the industrial-arts teacher can be particularly effective is the placement of students in part- or full-time jobs.

To delimit this area, it will be well to confine ourselves to preparation for the job, placement in the job, and follow-up at some future date.

By the preparation for the job is meant the teaching of the students to competently and adequately perform those duties which are required. These operations must meet the standards of the trade. Thus, a plumber's helper will be required to cut pipe, thread pipe, etc., but will not be required to *wipe a joint*. The apprentice electrician will be required to cut cable, connect sockets, and install wiring, but will not be required to inspect the finished job.

The industrial-arts teacher is aware of the trade standards and the various levels of skill and competency required by virtue of his experiences. He can adequately prepare his students for the job he is seeking in the trade.

Entry into the job is difficult. There are many obstacles. Two problems are union membership and location of the job.

In general, union membership for the vocational school student means entering as an apprentice, progressing to helper and finally to mechanic or journeyman. This can be a simple process where the union has an agreement with the school to accept its graduates. This plan is now operating in some communities. It is not a general condition, but a future trend.

The industrial-arts teacher can be very effective in guiding the student through the process of applying for union membership, apprenticeship, or as a helper, mechanic, or journeyman. The teacher, quite frequently, has been a journeyman and has gone through the process. His contacts with the officers and rank and file can be of utmost importance to the apprentice, in obtaining membership and in locating the entry job.

Placement is the logical result of the activities of the industrial-arts teacher, contrasted with the activities of the subject matter specialist.

Conclusions

1. The industrial-arts teacher is in a better position to prepare students for employment because of his background and trade experience. He is familiar with trade standards at the various levels and can teach accordingly.

2. The industrial-arts teacher can effectively guide students to entry positions in the trade because of his contacts, union membership, and knowledge of the labor market.

3. Where union membership is required, the industrial-arts teacher, frequently a journeyman in his own right, can assist and direct the students in acquiring membership.

4. The industrial-arts teacher can thus be an effective vocational guidance counselor particularly in the placement of his students.

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Vocational Education In Peru
1944-1952

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Historical Background

The co-operative education program in Peru has made substantial progress in the improvement of vocational education since the co-operative agreement between the United States Government and Peru was signed by Kenneth Holland, then president of the Inter-American Education Foundation, in April, 1944. From its inception the program had been planned jointly and operated according to basic and project agreements signed by the Minister of Public Education, representing the Government of Peru, and the Chief of Field Party, representing the Institute of Inter-American Affairs. Since that date, the types of services rendered in industrial education have been primarily in teacher training, advisory assistance, and technical publications. These activities have been determined by the existing needs in the vocational education field, as well as by directives from the Ministry, and the special interests and abilities of the U. S. specialists. Government education budget considerations also have strongly influenced project emphasis.

During the past years The Institute of Inter-American Affairs, Division of Education, working with the Peruvian Ministry of Public Education, through the organization known as the Servicio Cooperativo Peruano Norteamericano de Educación, or SECPANE, has placed major emphasis, in terms of personnel and budget, upon the development of vocational education.

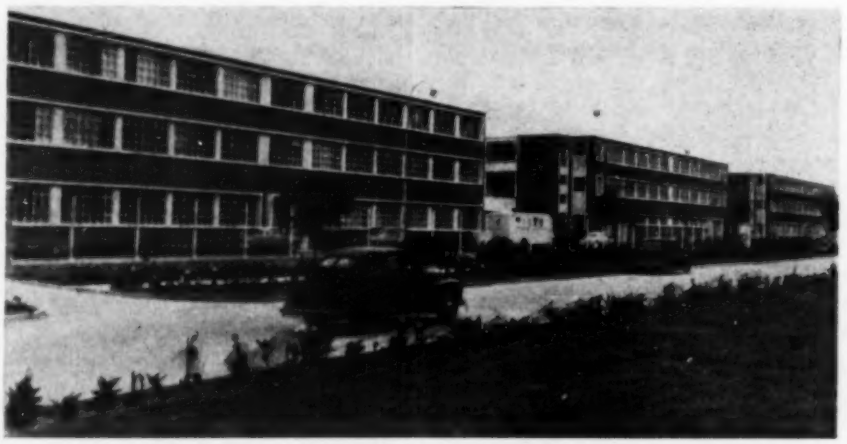
A staff of specialists in the field of trade and industrial education and industrial arts has been maintained for the purpose of working co-operatively with the Ministry of Education of Peru, and the Peruvian Director of Technical Education in particular, in planning and equipping technical schools and in the preparation of competent teachers for the staffing of those schools.

Peru's National Education Plan

Under a Peruvian law passed in December, 1948, a National Education Fund was created which has made it possible to invest a greater amount of money in public education. The effectiveness of this new law may be seen in the following summary of its returns:

1948	S/o. 2,394,418
1949	12,240,734
1950	17,870,936
1951	25,601,154
1952	43,396,068

In partial fulfillment of the National Education Plan, there were in actual operation in 1952 six new central school units, "Grandes Unidades Escolares," and five new national schools. Six more central school units were nearing completion during 1952.



View of the Central School Unit (Grandes Unidades Escolares) "Meliton Carvajal," which is located in Lima. The Technical Division of the Central Normal School has occupied a part of this new building. The offices of the Ministry of Education are also located here

Industrial Education in Peru

The future economic status of Peru will depend in part on the development of an intelligent program of industrial education. Although Peru is essentially an agricultural country, it has tremendous industrial possibilities.

For the first time in the educational history of Peru, the number of schools of technical education exceeds the number of national schools of secondary education. As compared with 112 Technical Institutes in 1951, there were only 98 National Schools in operation. This number includes 30 schools of commercial subjects; 22 agriculture; 25 women's industrial schools; 34 industrial schools for boys; and one normal school.

Though the number of technical schools exceeds those of secondary instruction, the number of students in the former is much less than in the latter. As compared with a school population exceeding 45,000 in the National Schools, there were only 17,848 attending Secondary Technical Institutes, or a ratio of nearly three to one. The Peruvian Government is seeking to modify this proportion.

As a significant index of the progress achieved in technical education, it is worth noting that the number of schools which in 1948 amounted to 106, was increased by 1951 to 112. The school population which in 1948 was only 9,095 pupils numbered 17,848 in 1952, an increase of 96 per cent.

Schools of technical education not only fulfilled their educational role, but also contributed to their own support with a considerable sum. Finally, the budget allocated to this branch of education in 1948 was S/o. 11,883,177 compared with S/o. 21,119,392 in 1952, representing an increase of 77 per cent.

Industrial Teacher Preparation

According to the Peruvian Minister of Education, the most basic need for the immediate future is the development of competent leaders for elementary, secondary, technical, and normal schools. The need for better teachers is nationwide. The schools need better teachers and the teachers need higher salaries.

Formal industrial teacher education programs for those in service were undertaken every year during the summer vacation period. Workshops varied in length from six weeks in 1946 to four weeks in 1948. In addition to specialized trade training, shop teachers were given courses in shop organization, administration, teaching methods, and shop mathematics. Seminars were conducted for industrial school administrators and school supervisors. Workshops were attended by teachers representing four vocational groups: industrial schools for boys; industrial schools for girls; schools of agriculture; and schools of commerce. Attendance varied from a low of 600 teachers in 1946 to a high of 1300 in 1947.

The first teacher training course was given in 1946–47. This nine-month course was given by Engineer Gustavo Reusens to 49 men from six different trades. These men were in-service teachers. In 1946 and 1947 SECPANE, the cooperative Servicio, in collaboration with the Inter-American Development Institute, offered a course in teaching methods for craftsmen in silver, weaving, leathercraft, ceramics, carpetmaking, and wood carving. This course also was developed by Mr. Reusens.

Long term training was begun in the plumbing trade by Mr. Roy Dodson in 1948 for 14 graduates of the five-year trade school program. Training was done in the shops of the "Politécnico Principal del Perú." This school plant was selected because it was the best equipped in Peru. These men continued their studies until June, 1949, when they were absorbed by the industrial schools where they taught the first courses in plumbing ever offered in Peru.

In auto mechanics, a long term teacher education program was initiated in 1949 in the same institution by J. Arthur Elmer. Teachers already in service and vocational school graduates were given four and one-half months of trade training and professional courses. This same group of 12, the first teachers to receive formal instruction in this trade, took an additional two months of training in 1950.

SECPANE vocational specialists were active between 1946 and 1952 in the planning and execution of at least one on-the-job short course for trade teachers in each of the seven polytechnical schools of Peru.

In 1951, a five weeks' summer workshop was attended by 100 teachers of trade and industrial subjects, 75 of whom had not previously taken teacher education courses. Between February 12 and March 15, shop courses were given in woodshop, electricity, radio, foundry, auto mechanics, machine shop, forging and welding, sheet metal, and plumbing. The other half of each school day was devoted to classroom work in shop mathematics, mechanical drawing, and teaching methods. This workshop served not only as a source of additional training for in-service teachers, but also as a check on the qualities of those eight men previously selected to teach shop courses in the Central Normal School. These eight men had been recruited from both school and trade situations; all were in need of close supervision and counseling in the performance of their instructional duties.

In 1952, a six-week workshop was given at the new secondary school, "Melitón Carvajal" in Lima for 55 second category teachers plus 40 men and 40 women supervisors of industrial schools. Central Normal School teachers taught the technical subjects in both 1951 and 1952. Courses were given in visual aids, shop administration, teaching methods, in addition to actual shopwork in auto mechanics; drawing; bench mechanics and machine shop; carpentry and cabinetmaking; blacksmithing and welding; and electricity. Ten hours a week were spent in theory courses while 15 hours were devoted to shop subjects.

Central Normal School

From the first days of the Servicio, the need for the establishment of a permanent industrial teachers' training program was recognized.

(To be continued)

HOPE RENEWED

A $10 CARE food package sent through CARE, 20 Broad Street, New York City, or your local CARE office, will bring renewed courage to suffering war orphans and refugees in South Korea . . . to impoverished villagers in India . . . to Iron Curtain refugees whose dreams of freedom are mocked by their precarious existence in Western Germany . . . to the weary and worried in a score of countries from Italy to the Philippines. Whatever the language men speak, your CARE gift will be universally understood. It will express your Easter prayer for a world united in peace and brotherhood.

More than four billion gallons of petroleum products were consumed in 1952 in tractors alone. — *Petroleum Newsnotes*

Industrial Arts and Vocational Education
John J. Metz, *Editor*

ARE YOU GOING TO ATTEND SUMMER SCHOOL?

This is the time of the school year that requires the school-shop teacher to make many decisions. Not the least of these is to decide whether he is to enter an industrial plant and gain additional experience in the trades or occupations that he is representing to his students, or whether he is to work toward advanced educational degrees to further his standing in his profession.

Both objectives must be carefully considered. Both will mean advancement of a very definite kind. While industrial service may promise more immediately in the way of monetary results, nevertheless, educational advances, both in professional standing and higher salaries for the future can only be gained by attending teacher-education institutions.

Many of these schools offer opportunities for study during the summer vacation. This is an ideal opportunity for school teachers to advance themselves professionally. A number of these teacher educating institutions avail themselves of offering their services to the teachers through our magazine.

The following list is presented to help teachers decide when and where to go for their 1953 adventure in furthering their education. Choose the institution you wish to attend and write for a summer school bulletin.

Bradley University, Peoria 5, Ill. June 10 to July 16, July 16 to August 20.

Colorado A. & M. College, Fort Collins, Colo. June 22 to July 17, and July 20 to August 14.

New York University, Washington Square, New York 3, N. Y. Intersession, June 1 to 26. Summer session, June 29 to August 7. Postsession, August 10 to September 4.

Oregon State College, Corvallis, Ore. June 22 to August 14.

Oswego State Teachers College, Oswego, N. Y. Intersession, June 15 to 26. Summer session, June 29 to August 7. Postsession, August 10 to 21. Also two-week workshop — auto mechanics, driver education, elementary education, metals technology.

Pennsylvania State College, Room 102F, Burrowes Bldg., State College, Pa. Intersession, June 9 to 26. Main session, June 29 to August 8. Postsession, August 10 to 28.

The Stout Institute, Menomonie, Wis. June 15 to July 24. Also three-week workshops in teaching vocational education and adult homemaking.

University of Minnesota, 757 Johnston Hall, Minneapolis 14, Minn. June 15 to July 18, and July 20 to August 22.

University of Southern California, Los Angeles 7, Calif. June 22 to July 31, and August 3 to August 28.

Wayne University, Detroit 1, Mich. June 22 — six, eight, or ten weeks. Work experience can be arranged for all or part of the vacation at a wage of sixty dollars per week, and four hours of college credit.

REQUISITION TIME

Shop teachers may be looking forward expectantly to vacation time, but requisition time is not anticipated with the same fervor. There are good reasons, of course, why the one should be more attractive than the other.

But pleasant or not, requisition time is approaching, and the May issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION has been known for years as the requisition number of the magazine.

Those who have been teaching for years will take the matter of deciding on items, and calculating quantities of new equipment, materials, and supplies needed for the school year 1953–54 as a matter of course. Younger entrants into the shop teaching field may not feel so easy about tackling the job. Probably they may gain some help by reading the article, "It's Requisition Time," on page 143 of the May, 1952, issue.

Aid in finding sources from which the many items needed in the school shop may also be found by scanning the advertising pages of this and past copies of our magazine.

It is well to patronize these dealers and manufacturers of school-shop equipment, materials, and supplies. They have studied the school market for many years, and can and will help the individual teacher as they have helped the entire field for many years. They are reputable businessmen who have done much to raise the quality of industrial arts and vocational education to the high level it has reached.

Make the best of their service and requisition time for 1953 and the future will not be as troublesome as it may appear right now.

BEAUTIFYING THE SCHOOL SHOP

An attractive shop helps both student and teacher. To make the school shop attractive does not mean that the teacher should strive to make it look like the living room in a well-appointed home, but to make the home attractive requires the same kind of planning and contriving as that required for making the school shop pleasing and inviting for the boys who are learning their shopwork in it.

It is self-evident that refurbishing or rejuvenating of the school shop requires careful and painstaking planning if the best results are to be achieved. The first objective, of course, is to make the shop attractive by its orderliness and cleanliness. These two things must go together if the shop is to be truly attractive. It is not sufficient alone that everything is in order, but it must also be clean.

Have you devised a method to get your students to help in cleaning up the shop? Are they accustomed to assume their part in the cleaning process without loitering or objecting to the work as something that ought not be required of them?

After you have trained your boys to take a real interest in keeping the shop clean, you will surely not have much trouble in making them see the advisability of having everything in good order.

The students themselves may be brought into the planning phase of devising attractive tool panels, shelves for storing materials, display cabinets for exhibiting the well-designed and constructed projects that have been produced, bookshelves and a table for the planning nook.

Some teachers may retort that this is too late in the year to attempt this kind of work — but is it? Your shop may need this sort of face lifting for next year. Get your students to help prepare for the shop season 1953–54. It will be a great help to you and to your shop, and it will be excellent training that the boys may apply in their own homes.

Project Design for Teachers

ALEXANDER F. BICK
Milwaukee, Wis.

This is the first of a series of articles on *project design* which we hope will be of service to the teachers of industrial arts and vocational education. The subject will be treated in a practical manner with the primary purpose of producing useful projects.

It is hoped that this series will present a background that will aid the school shops to keep up to date on present industrial design trends, and point out professional-design source materials and show how it is to be used.

Primarily, however, this series will discuss and illustrate specific designs of a variety of shop projects, alternating the offerings between those for woodshop, art metalwork, machine shop, weld shop, and plastic work, with special emphasis on the first two.

Design is something specific. It really means *a plan*. Good design then means a good plan, one that best fulfills its purpose and also pleases the eye. So *use*, or *function*, and *pleasing the eye* may be said to be the purpose of design.

The following is a typical way of planning a wood lamp base:

It is evident, therefore, that design procedures are divided into two parts:

1. *Use*, or that which provides functional efficiency, and

2. *Art*, or that which qualifies the functional to give greater expression, giving it a *style*.

The first is engineering of a sort: devising a structure to hold an electric socket 12 inches off the level of a table, using a minimum of material, and modifying it for the maker's ability and equipment. The second, however, is an art. Art in this case consists of intelligent interpretation of the effect of an idea on the basic form, and how the latter may be modified without weakening function. The *idea* may be

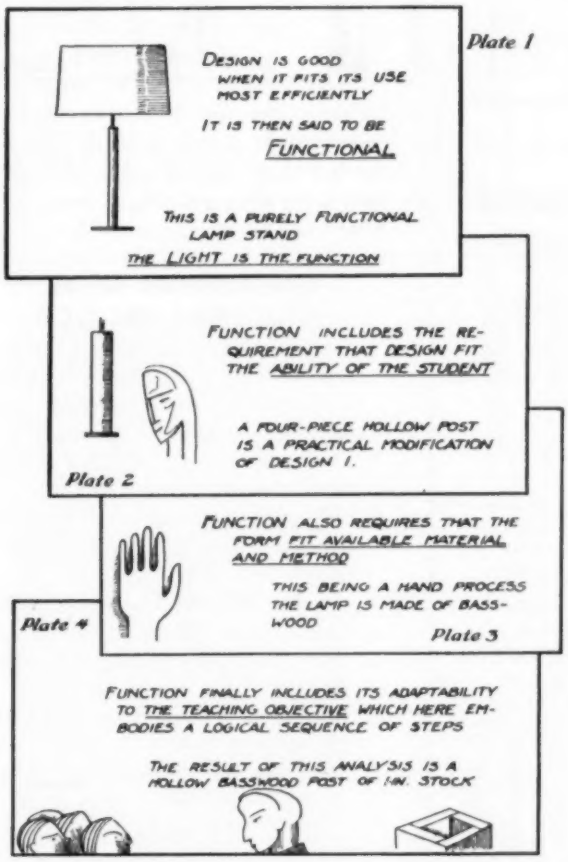
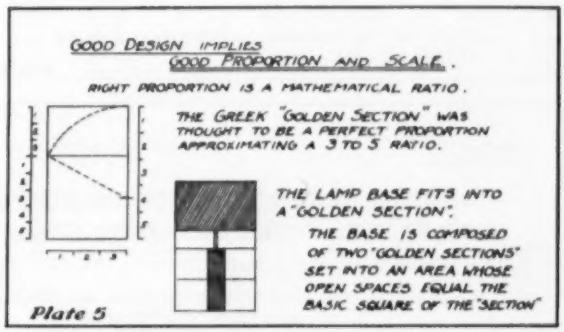
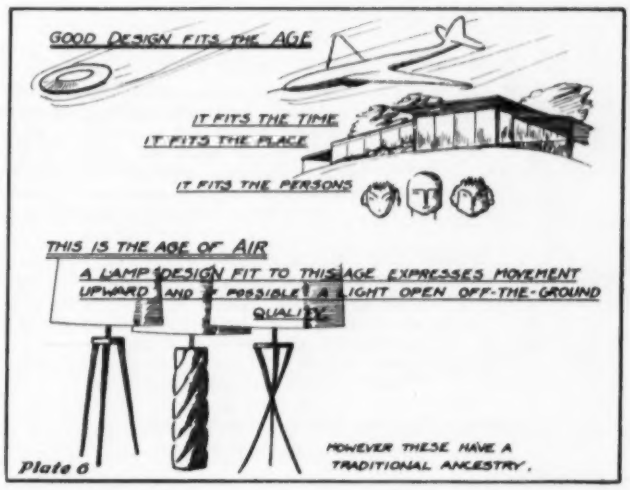


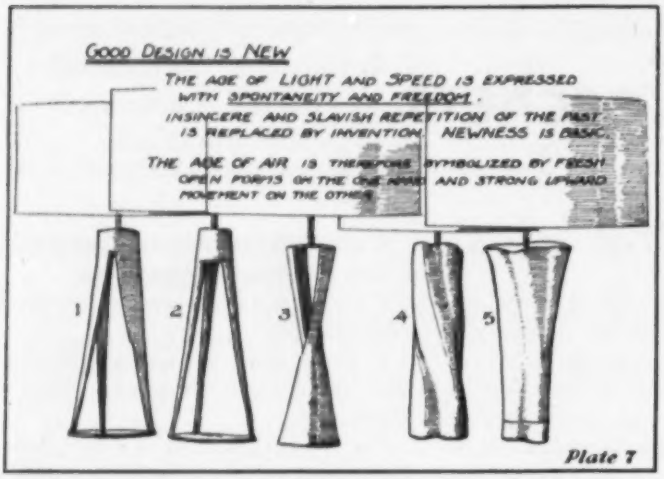
Plate 1
DESIGN IS GOOD WHEN IT FITS ITS USE MOST EFFICIENTLY
IT IS THEN SAID TO BE FUNCTIONAL
THIS IS A PURELY FUNCTIONAL LAMP STAND
THE LIGHT IS THE FUNCTION
FUNCTION INCLUDES THE REQUIREMENT THAT DESIGN FIT THE ABILITY OF THE STUDENT
A FOUR-PIECE HOLLOW POST IS A PRACTICAL MODIFICATION OF DESIGN 1.
Plate 2
FUNCTION ALSO REQUIRES THAT THE FORM FIT AVAILABLE MATERIAL AND METHOD
THIS BEING A HAND PROCESS THE LAMP IS MADE OF BASSWOOD
Plate 3
Plate 4
FUNCTION FINALLY INCLUDES ITS ADAPTABILITY TO THE TEACHING OBJECTIVE WHICH HERE EMBODIES A LOGICAL SEQUENCE OF STEPS
THE RESULT OF THIS ANALYSIS IS A HOLLOW BASSWOOD POST OF 1/4 IN. STOCK

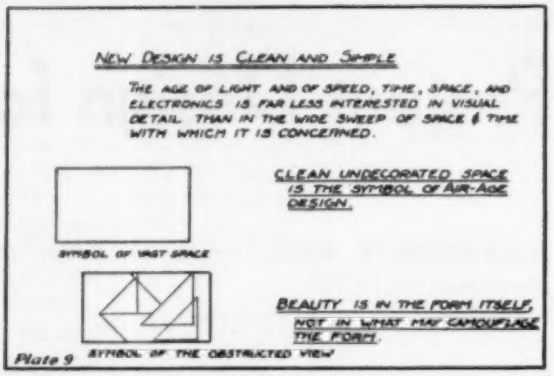
As now modified, the lamp is purely functional, though not necessarily pleasing to the senses

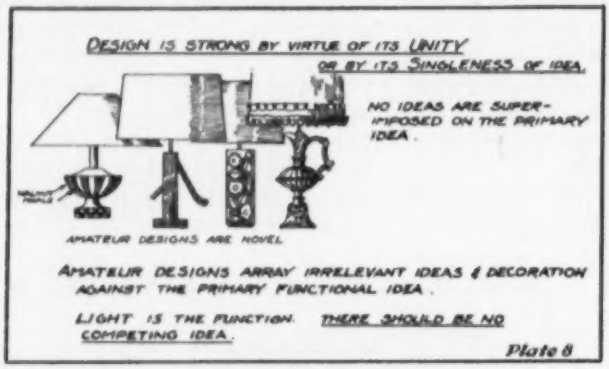

GOOD DESIGN IMPLIES GOOD PROPORTION AND SCALE.
RIGHT PROPORTION IS A MATHEMATICAL RATIO.
THE GREEK "GOLDEN SECTION" WAS THOUGHT TO BE A PERFECT PROPORTION APPROXIMATING A 3 TO 5 RATIO.
THE LAMP BASE FITS INTO A "GOLDEN SECTION".
THE BASE IS COMPOSED OF TWO "GOLDEN SECTIONS" SET INTO AN AREA WHOSE OPEN SPACES EQUAL THE BASIC SQUARE OF THE "SECTION"
Plate 5

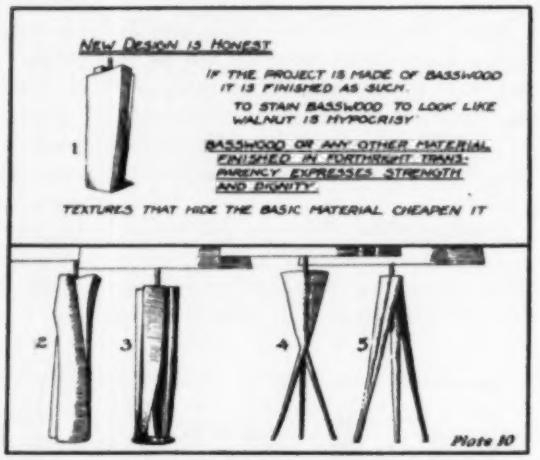
From this point the functional form progresses through several changes until it becomes an expression of the present age

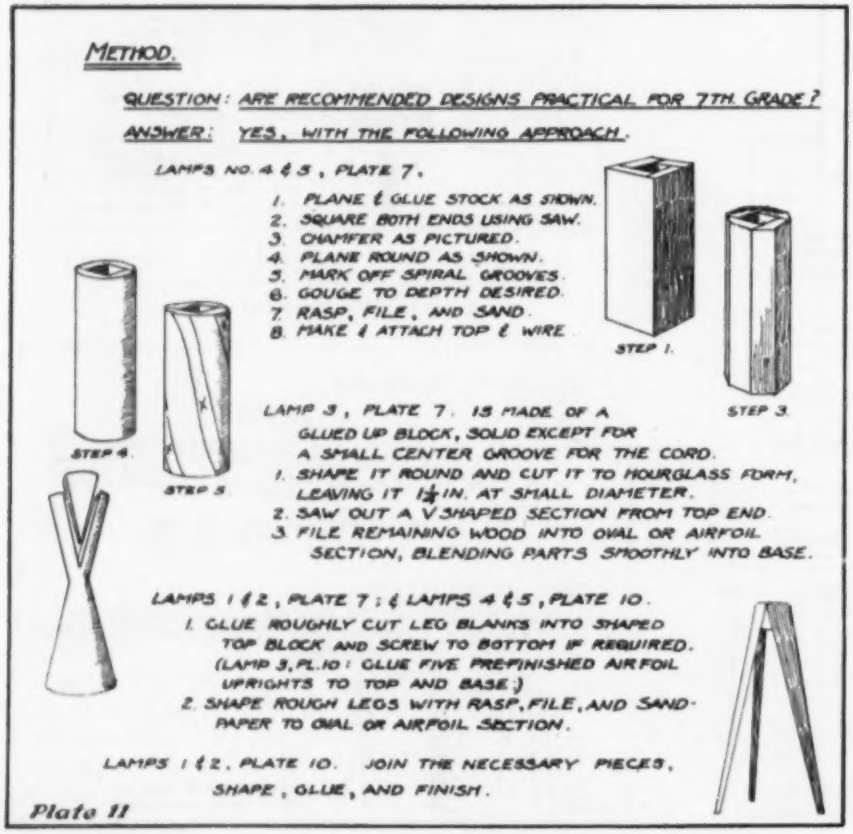

GOOD DESIGN FITS THE AGE
IT FITS THE TIME
IT FITS THE PLACE
IT FITS THE PERSONS
THIS IS THE AGE OF AIR
A LAMP DESIGN FIT TO THIS AGE EXPRESSES MOVEMENT UPWARD AND IF POSSIBLE A LIGHT OPEN OFF-THE-GROUND QUALITY.
HOWEVER THESE HAVE A TRADITIONAL ANCESTRY.
Plate 6


GOOD DESIGN IS NEW
THE AGE OF LIGHT AND SPEED IS EXPRESSED WITH SPONTANEITY AND FREEDOM.
INSINCERE AND SLAVISH REPETITION OF THE PAST IS REPLACED BY INVENTION. NEWNESS IS BASIC.
THE AGE OF AIR IS THEREFORE SYMBOLIZED BY FRESH OPEN FORMS ON THE ONE HAND AND STRONG UPWARD MOVEMENT ON THE OTHER.
1
2
3
4
5
Plate 7


NEW DESIGN IS CLEAN AND SIMPLE
THE AGE OF LIGHT AND OF SPEED, TIME, SPACE, AND ELECTRONICS IS FAR LESS INTERESTED IN VISUAL DETAIL THAN IN THE WIDE SWEEP OF SPACE & TIME WITH WHICH IT IS CONCERNED.
CLEAN UNDECORATED SPACE IS THE SYMBOL OF AIR-AGE DESIGN.
SYMBOL OF VAST SPACE
BEAUTY IS IN THE FORM ITSELF, NOT IN WHAT MAY CAMOUFLAGE THE FORM.
SYMBOL OF THE OBSTRUCTED VIEW
Plate 9


DESIGN IS STRONG BY VIRTUE OF ITS UNITY
OR BY ITS SINGLENESS OF IDEA.
NO IDEAS ARE SUPERIMPOSED ON THE PRIMARY IDEA.
AMATEUR DESIGNS ARE NOVEL
AMATEUR DESIGNS ARRAY IRRELEVANT IDEAS & DECORATION AGAINST THE PRIMARY FUNCTIONAL IDEA.
LIGHT IS THE FUNCTION. THERE SHOULD BE NO COMPETING IDEA.
Plate 8


NEW DESIGN IS HONEST
IF THE PROJECT IS MADE OF BASSWOOD IT IS FINISHED AS SUCH.
TO STAIN BASSWOOD TO LOOK LIKE WALNUT IS HYPOCRISY
BASSWOOD OR ANY OTHER MATERIAL FINISHED IN FORTHRIGHT TRANSPARENCY EXPRESSES STRENGTH AND DIGNITY.
TEXTURES THAT HIDE THE BASIC MATERIAL CHEAPEN IT
1
2
3
4
5
Plate 10


METHOD.
QUESTION: ARE RECOMMENDED DESIGNS PRACTICAL FOR 7TH GRADE?
ANSWER: YES, WITH THE FOLLOWING APPROACH.
LAMPS NO. 4 & 5, PLATE 7.
1. PLANE & GLUE STOCK AS SHOWN.
2. SQUARE BOTH ENDS USING SAW.
3. CHAMFER AS PICTURED.
4. PLANE ROUND AS SHOWN.
5. MARK OFF SPIRAL GROOVES.
6. GOUGE TO DEPTH DESIRED.
7. RASP, FILE, AND SAND.
8. MAKE & ATTACH TOP & WIRE.
STEP 1.
STEP 3.
STEP 4.
STEP 5.
LAMP 3, PLATE 7. IS MADE OF A GLUED UP BLOCK, SOLID EXCEPT FOR A SMALL CENTER GROOVE FOR THE CORD.
1. SHAPE IT ROUND AND CUT IT TO HOURGLASS FORM, LEAVING IT 1½ IN. AT SMALL DIAMETER.
2. SAW OUT A V SHAPED SECTION FROM TOP END.
3. FILE REMAINING WOOD INTO OVAL OR AIRFOIL SECTION, BLENDING PARTS SMOOTHLY INTO BASE.
LAMPS 1 & 2, PLATE 7; & LAMPS 4 & 5, PLATE 10.
1. GLUE ROUGHLY CUT LEG BLANKS INTO SHAPED TOP BLOCK AND SCREW TO BOTTOM IF REQUIRED. (LAMP 3, PL. 10: GLUE FIVE PREFINISHED AIRFOIL UPRIGHTS TO TOP AND BASE.)
2. SHAPE ROUGH LEGS WITH RASP, FILE, AND SANDPAPER TO OVAL OR AIRFOIL SECTION.
LAMPS 1 & 2, PLATE 10. JOIN THE NECESSARY PIECES, SHAPE, GLUE, AND FINISH.
Plate 11

air age, or *time and space*, or anything that represents the concept of today. The product is a union, expressing both elements in design, function, and art, as one complete whole.

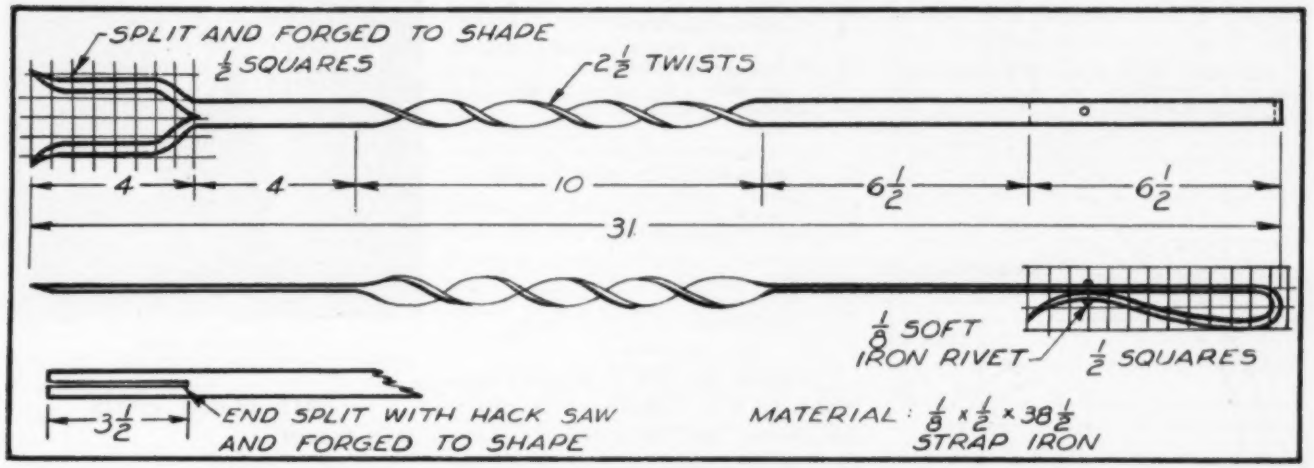
EVALUATION OF A STUDENT'S PROJECT

1. Does it meet a real need? Is it an article that the student wants to make for his home or home workshop, for the yard, for a gift, or for recreation?
2. Does it involve new skills and processes that are within his ability?
3. Is it too simple for the grade level, offering nothing but "some more of the same"?
4. Does the student have some freedom in the selection of the design?
5. Does it offer opportunity for problem solving?
6. Does he have an opportunity to participate in planning?

— From "Shop-News," Los Angeles City Schools.

Common sense is the knack of seeing things as they are and doing them as they ought to be done. — *C. E. Stone.*

PROBLEMS AND PROJECTS



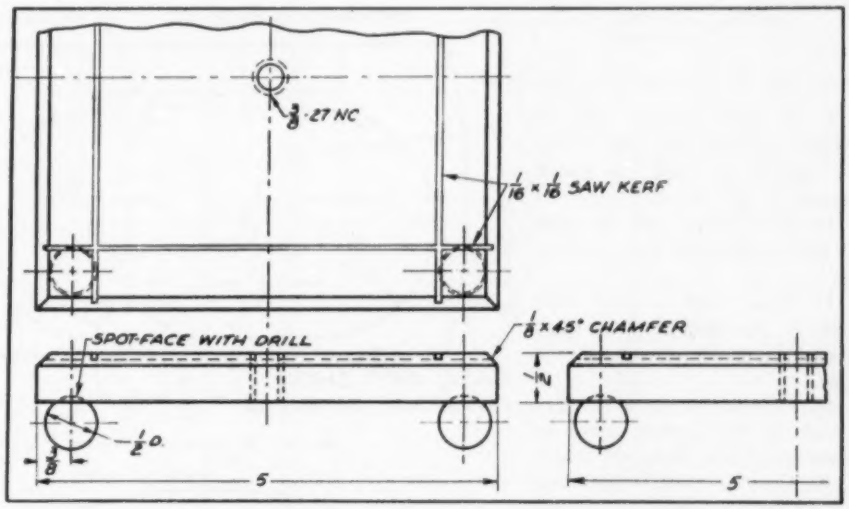
Toasting fork by E. David Godshall, Dundalk Junior-Senior High School, Baltimore, Md.

A PLASTIC DRESSING TABLE LAMP

JOHN GUNDERSON and **FRANK STEH**
Industrial Education Department
Southern Illinois University
Carbondale, Ill.

The student participating in a general shop program will find that the making of the dressing table lamp described herewith, provides him with experiences in the basic fundamentals of using plastics, metal, wood, electricity, and working drawings.

A modern dressing table lamp



Base for the dressing table lamp

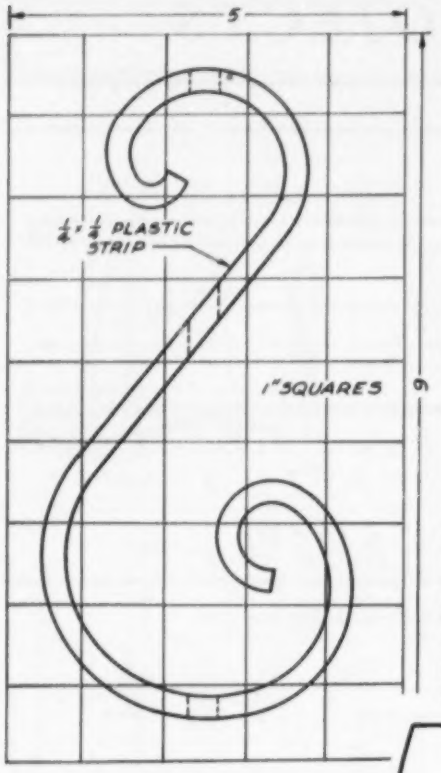
The lamp not only lends itself as a learning unit but provides a useful household article.

It will be necessary for the student to lay out the scroll figure full size on wood, and to cut a groove into the wood sufficiently large to permit the insertion of the warm plastic. The holes in the plastic scroll may best be made by allowing it to remain in the jig and drilling both simultaneously. Greater accuracy may be achieved if the two upper holes are drilled at one time, allowing the base hole to be made individually.

The major operations consist of sawing and drilling plastics and wood, bending Plexiglas, tapping threads in plastics, threading tubular metal stock, wiring an electric lamp, and buffing, polishing, and cementing the plastic parts.

Method of Procedure

1. Lay out and cut bending jig from scrap.
2. Mount jig on piece of ¼-in. plywood to give additional strength to scroll.
3. Cut strip of ¼-in. plastic; sand edges with wet or dry paper and buff to a luster.
4. Cut base of ½-in. plastic; sand edges with wet or dry paper and buff to a luster.
5. Saw kerf into the base.
6. Place chamfer on top arris of base.
7. Spot-face underside of base with drill to provide seat for plastic feet.
8. Drill and tap base with ⅜ in., 27 threads per inch tap.



BILL OF MATERIAL

No. of Pieces	*Name*	*Size*
1	Colored or clear Plexiglas	19½ x 1¼ x ¼ in.
1	Colored or clear Plexiglas plastic	5 x 5 x ½ in.
4	Colored or clear Plexiglas balls	½ in. dia.
1	Chrome plated copper tube (a plumbing supply known as a lavatory water supply tube serves very well)	¼ x 8½ in. long
1	Chrome plated light socket	
6 ft.	White rubber electric cord	
1	White male plug	
1	Scrap wood	5 x 9 x 1¼ in.
1	3-ply plywood	5 x 9 in.

Production per man is now five times what it was at the beginning of the century. The answer, says the Chamber of Commerce of the United States, is to be found largely in the increased use of machinery that speeds production. Such machinery requires heavy capital investment and such investment can come only out of earnings.

9. Cut chrome plated tube to length and thread both ends ⅜ in., 27 threads per inch, to match threads in light socket.

10. Heat Plexiglas strip and bend to form scroll by placing in wooden jig.

11. When scroll is cool drill hole in jig through strip large enough to permit chrome tube to pass.

12. Place a few drops of Plexiglas cement in the spot-face marks on underside of base and insert plastic balls. Allow to remain undisturbed for a period of time to give a secure union.

13. Screw tube into base and place scroll over tube.

14. Attach light cord to socket and thread cord through tube.

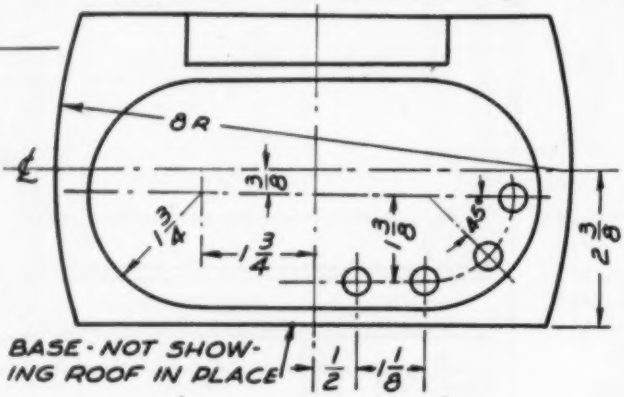
15. Attach two-prong plug to free end of electric cord.

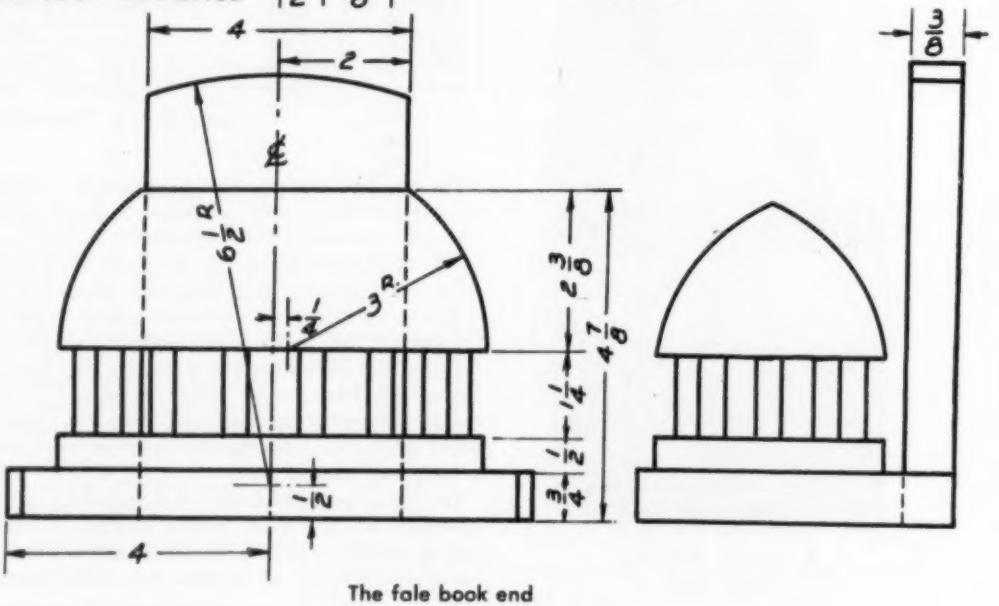
16. A drop of Plexiglas cement may be used to secure scroll to base or, if preferred, it may be allowed to remain free and be turned frequently to change its position.

17. Wash plastic parts with warm water and mild soap to remove dirt and grease.

18. Apply a coat of wax and polish with soft cloth.

19. Select bulb and shade.





The fale book end

Fale book ends

FALE BOOK ENDS

JACK DOWN
Pago Pago, Tutuila
American Samoa

Most Samoan woodworking projects would be of little use in the average stateside high school, but occasionally a project does come along that is clever, useful, and of a sort that should interest many students.

This book-end set is one of these. The Samoan family live in a house with a thatch roof set up on poles. This building is called a fale (fä'lē). This book end is a simplified model of the Samoan house and would interest people who had never seen such a dwelling. The student might have enough interest to do a little geographic study to find out more about these Americans, the Samoans.

The grain of the coconut wood simulates the thatch of the roof, and where this wood is available it adds an interesting touch.

In the original the poles were handmade and were about ⅜ in. in size. The floor of the fale and the support for the books were held with wood pins but screws would do as well.

Of course the holes for the posts were spaced by eye but approximate dimensions are given.

The finished product was left natural.

In 1925, oil and gas accounted for only 28 per cent of the nation's energy requirement. Now, they account for 57 per cent of the total and are expected to continue this increase. — *Petroleum Newsnotes.*

FINISHING TABLE

CLOYCE L. HUNT
Building Trades Instructor, and
BENNY L. VINEYARD
Machine Shop Instructor
Industrial Education Department
Township High School
Mt. Vernon, Ill.

Here is a finishing room table that can be constructed cheaply and can make finishing much less work. The table top can be rotated, making it possible to stand in the best position for light and to move the piece being finished without touching or walking around the table.

The table was designed and built by C. L. Hunt, building-trades instructor, and Benny Vineyard, machine-shop instructor, vocational department of the Mt. Vernon Township High School, Mt. Vernon, Ill.

The table is made from scrap and parts obtained from the junk yard. The base is a truck wheel and the column is one half of a Ford axle housing. The spindle is a 23¼-in. piece of round 2-in. stock, with one end turned to a 1 1/16-in. diameter. The length of the small diameter is 1¼ in. The shouldered end forms a bearing surface for the spindle. The top was from an old dining table. This was covered with 22-ga. galvanized iron.

All the work may be done with the tools and machines usually found in a general shop.

Procedure

Column

1. Flame cut the top of a differential housing to desired length.

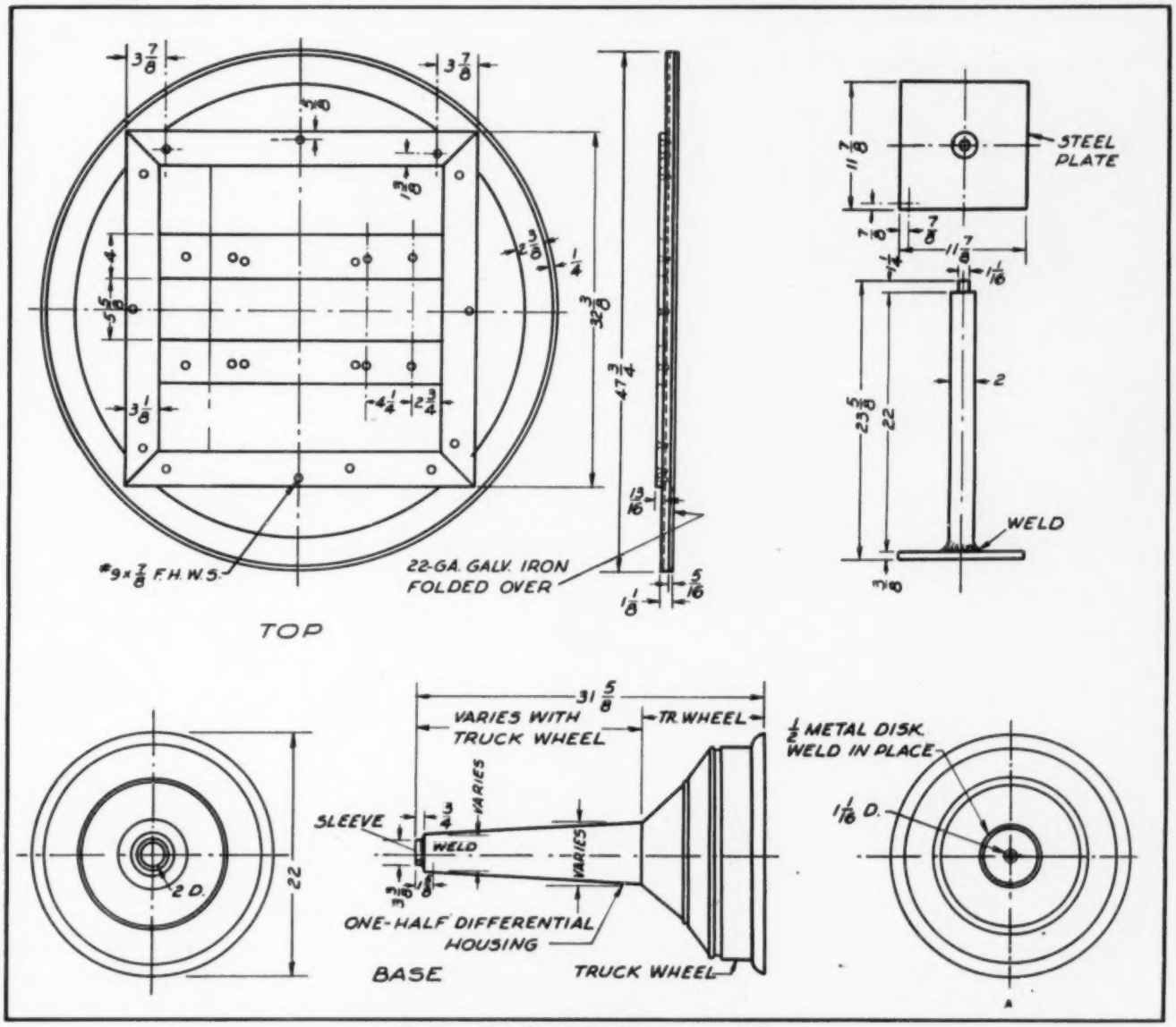


Fig. 1. Details of finishing room table

2. Flame cut the disk supporting the top to desired size.

3. Drill a 1 1/16-in. hole in the center of a supporting disk.

4. Turn the sleeve on the column to the desired size.

5. Weld the sleeve and disk in place with an arc or oxyacetylene welding outfit.

6. Weld the base of the housing to the wheel.

Housing Spindle

1. Cut a 2-in. piece of stock to size. A 1½-in. pipe may be used if round stock is not available.

2. Center drill, face, and cut shoulder on housing spindle.

3. Flame cut a ⅜ by 12 by 12-in. plate, and grind the edges. Drill four holes in corners as indicated in Figure 1.

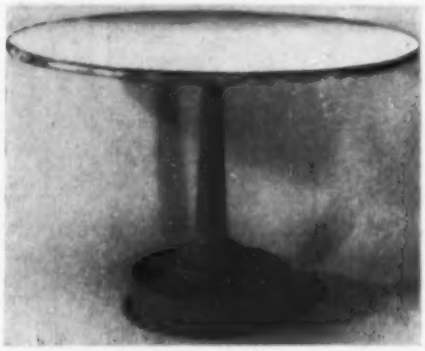


Fig. 2. The completed finishing table

4. Locate the center of the plate and weld the spindle to it.

5. Bolt the table top to the spindle plate.

Table Top

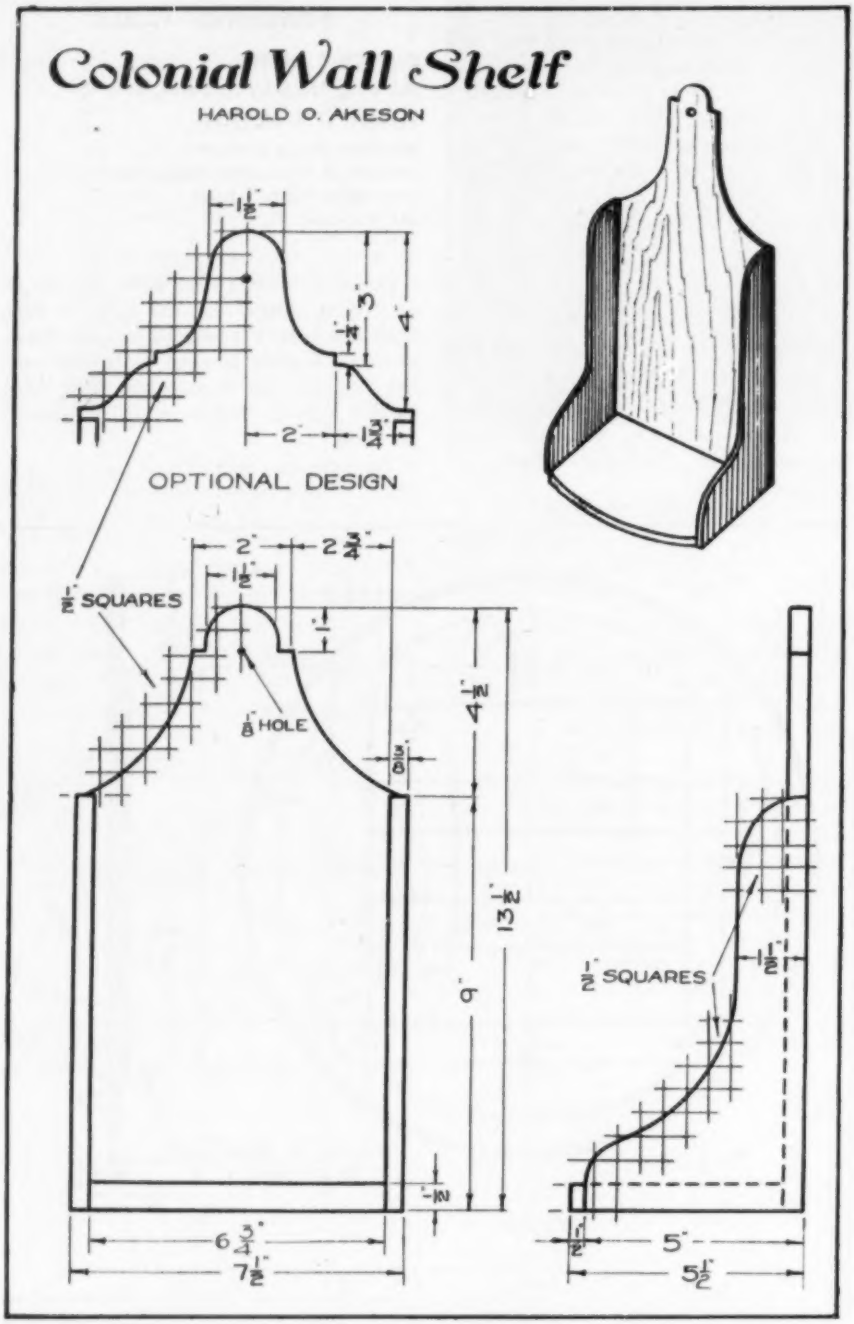
1. The table top may be cut from ¾-in. plywood if a round table top cannot be found.

2. Construct the table top reinforcements with 1 by ⅜-in. strips of wood, as shown in Figure 1. Attach the top with screws.

3. Lay out 22-ga. galvanized sheet, cut it to size, and fold it over the edge of the table.

4. Attach the spindle to the table top with wood screws.

5. Insert the spindle in the housing, and apply oil as needed to make the top rotate easily.



Colonial wall shelf

COLONIAL WALL SHELF

HAROLD O. AKESON
High School
East Orange, N. J.

This small shelf lends an old-fashioned atmosphere when used to decorate a Colonial room. It is a design typical of early New England having been used during the latter part of the seventeenth century.

Its use, as shown by the photograph, may be adapted to holding a candlestick, potted plants, a choice China piece, or other decorative pieces.

This project is very suitable for either the students in woodworking of the eighth grade, or of the high school.

Selection of material depends on the other furniture in the room where the shelf is to be used. For a room with an informal atmosphere, any of the cabinet woods such as mahogany, walnut, or maple would be suitable. Even pine could be used if there is a need of conformity to the room furnishings. Pine furniture and shelves have become very popular.

The parts are first squared to size, after being planed for thickness and then shaped to the design shown. After the pieces are sanded, glue and nail them together. All nails should be set beneath the surface.

Stain, or finish to match the furniture in the room. Nail holes should be filled with plastic

Colonial wall shelf

wood or putty filler to match the finish of the project.

For hanging the shelf drill a small hole at the top center of the back board.

A DRAFTING PROBLEM — THE RATCHET WHEEL

PERCY MARTINS
Instructor
Berkshire Industrial Farm
Canaan, N. Y.

Description: This is a ratchet wheel of 14 teeth with a central keyed hole for mounting on a shaft. The outside diameter is 4 in., center hole diameter is ⅞ in., the keyway is 3/16 in. wide by 1/16 in.; the wheel thickness is ½ in., scale — full size, material — cold rolled steel.

Objective: To make a two-view working drawing of the ratchet wheel.

Procedure

1. Draw horizontal and vertical center lines.
2. Set compass to a radius necessary for the outside diameter, and with center at 0 draw a circle.
3. Set compass to the radius needed for center hole and draw a second circle.
4. Divide the semicircle from A to H into seven equal parts. Assuming the subdivision complete, we have the points A, B, C, D, etc.
5. From these points draw tangents to the small circle. These lines are the faces of the teeth of the ratchet wheel.
6. To draw the backs of the teeth, draw lines from the points of the teeth, each one perpendicular to the face of the tooth two spaces behind it.

Thus FJ is drawn perpendicular to DT, and GK perpendicular to EJ.

7. Once J has been determined a circle may be described with O as center and OJ as radius, thus locating all points such as J and K in one operation.
8. Draw keyway to proper dimensions.
9. Project for side view.
10. Darken in all necessary lines to proper weight.
11. Dimension drawing.

Preliminary figures indicate that U. S. consumption of petroleum products in 1951 reached an all-time high of 7,101,000 barrels per day, 9 per cent more than in 1950. — *Petroleum Newsnotes*, American Petroleum Institute, New York City.

BRAZING OR SOLDERING IRON OR STEEL

J. W. BOLLINGER
Tulsa, Okla.

Iron or steel may be brazed without using oxyacetylene welding equipment by heating the pieces in a gas-fired forge, or in a gas-fired metal-melting furnace, and junior high school students can be readily taught how to do this brazing themselves.

The procedure is fairly simple:

1. Determine whether the pieces of metal can be placed in the forge or over the melting furnace so that the place that is to be brazed can be properly heated. If this cannot be done, then, of course, that particular job cannot be brazed by this method.
2. Work out how the two pieces are to be held together while the brazing is being done:

a) If they overlap, put a small rivet through them, or

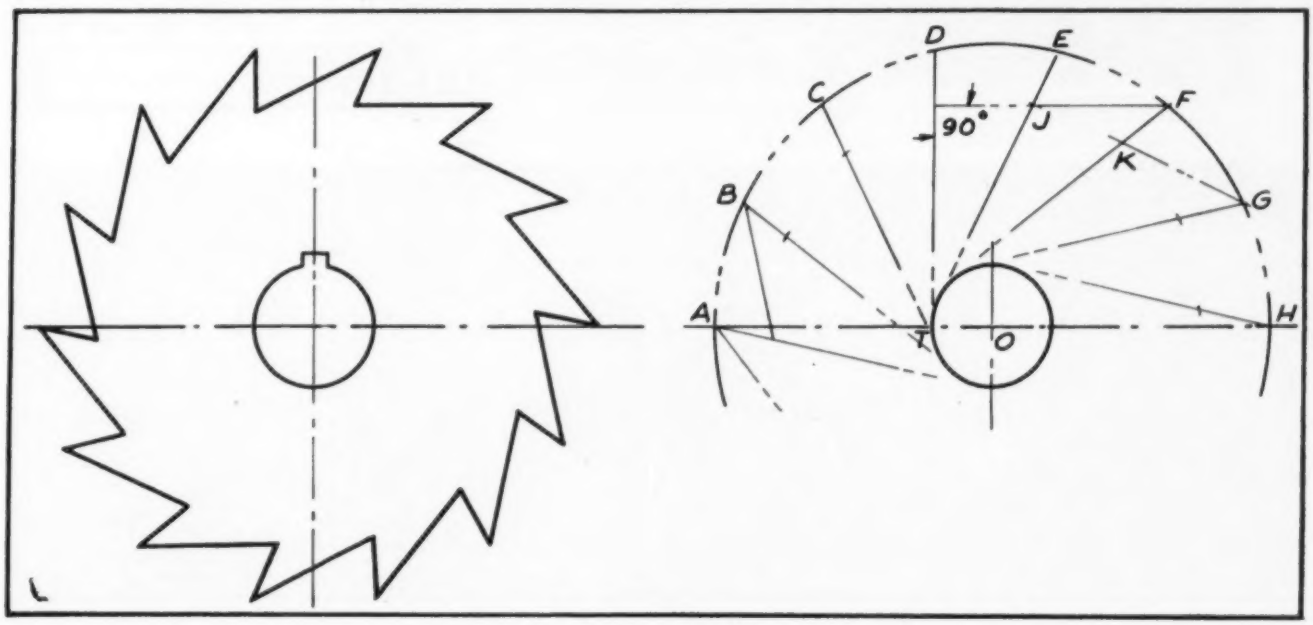
b) Wire them together securely with sturdy wire, or

c) Make a sturdy U-shaped piece and clamp the pieces to be brazed together, or

d) If the pieces butt up against each other, bevel or undercut the edges that are to receive the brazing material.

e) If a hole is to be brazed shut and the melted metal wants to drop through, wire a piece of sheet asbestos under the hole, temporarily.

3. Wherever possible, bevel or undercut the piece as is done in regular welding, so that a larger amount of brazing material may be applied.
4. Turn on the furnace and allow it to heat up to its maximum temperature.



The ratchet wheel as a drafting problem

5. Cut two or three pieces of regular brazing rod, each about 1 in. long. Place them where the joint is to be made. Sprinkle a small amount of regular brazing compound over the place to be jointed.

6. Place the job in the furnace where the fire is the hottest. Tip it in such a way that when the brazing rod melts it will flow across both pieces.

7. In a matter of minutes, the pieces of brazing rod will be seen to melt. It will require a temperature of about 1700 deg.

8. Take out the job, put on more pieces of rod if necessary and melt them in the same manner, until the desired amount of building up has been done.

9. Allow the job to cool off, and smooth the surface with a file or with emery cloth.

Pieces of iron also can be soldered together in a good soldering furnace, using ordinary solder.

1. File the pieces smooth and free of rust or scale.

2. Arrange a way to hold them in position while they are being soldered.

3. Bevel or undercut the pieces just as if they were being prepared for brazing.

4. Place them over the flame of the furnace until they become red, approximately 900 to 1000 deg.

5. Apply flux to the pieces. Ordinary soldering flux will not do for this, but rubbing them with a lump of sal ammoniac *will*, even if the iron is now coated with oxide or soot.

6. Apply acid core wire solder immediately after rubbing with sal ammoniac. If the solder does not go on perfectly, rub some more sal ammoniac over the joint.

7. Cool off, and smooth up with a file or with emery cloth.

A variation of the foregoing is to wrap the pieces of iron with a layer of 28 or 30-gauge copper wire. Then sweat the solder in with the soldering copper or directly over the flame.

The procedures just described are not new, but they may be found applicable on jobs that would be too difficult or almost impossible to be jointed if rivets or bolts were to be used.

UTILITY SAW

LELAND STROMBOM
High School
Industrial Arts Department
Sycamore, Ill.

The utility saw was designed by our advanced drawing class. Models of this saw were made and put to various applications. The following deductions resulted after an exhaustive analysis was made:

1. The project has plenty of student appeal, in other words "they like it."

2. Extremely useful in situations where space does not permit the use of the conventional type of hack saw.

3. Involves use of the metal lathe, metal shaper, and bench metal operations.

4. Cost of this project is not prohibitive and places it within the reach of every student.

5. It does not consume an unusual amount of time in its construction.

6. It adapts itself to any general metals course.

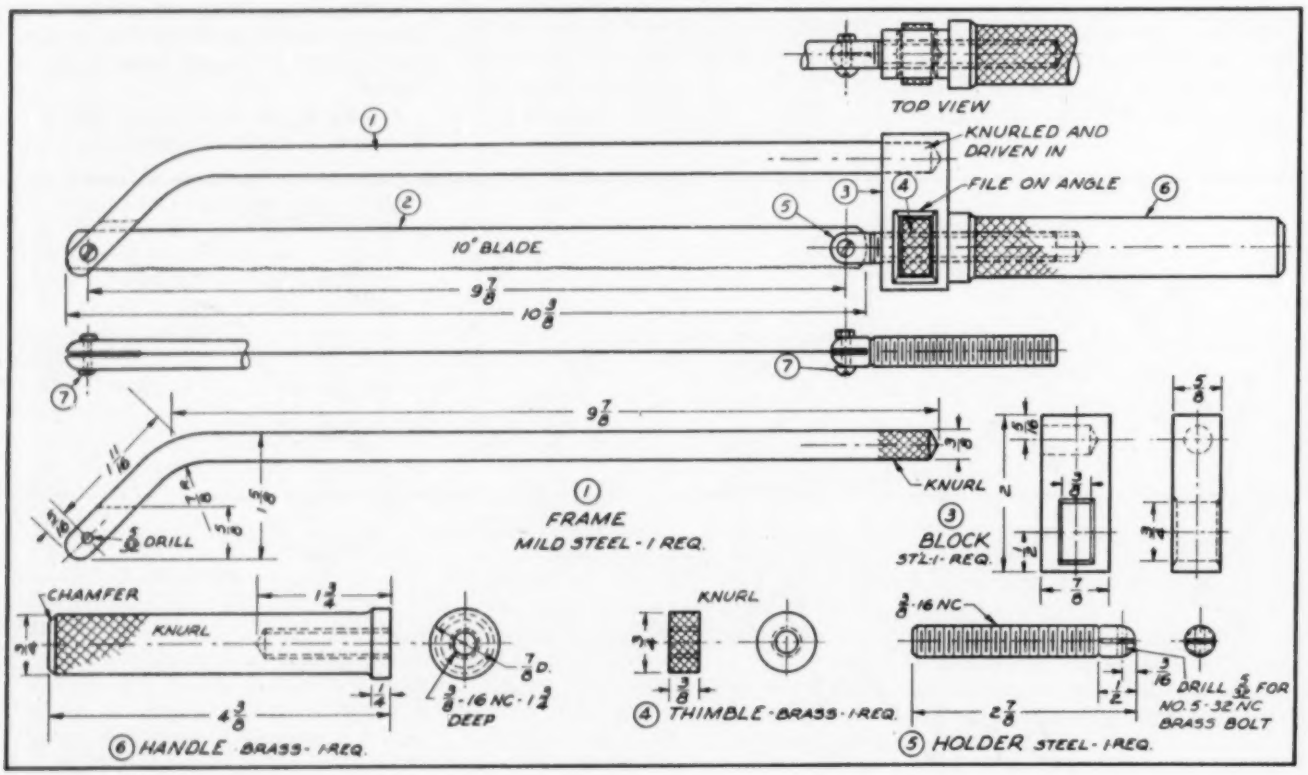
BILL OF MATERIALS

No.	*Name*	*Material*	*Size*
1	Frame	Mild steel	1/16 x 11 7/8
2	Blade	Standard	10 in.
3	Block	Mild steel	5/8 x 7/8 x 2
4	Thimble	Brass	3/4 in. d. x 3/8
5	Holder	Mild steel	3/16 in. d. x 2 7/8
6	Handle	Brass	7/8 x 4 3/8
7	Bolt	Brass	No. 5—32 n.c. x 5/8 in. long

PLASTICS CAN AID THE VISUAL AIDS PROGRAM

HAROLD HAINFELD
Roosevelt School
Union City, N. J.

The embedding of objects and specimens in clear plastic is an interesting project for students on the upper elementary and junior high school level. The use of the thermosetting plastic (Castolite or Ward's Bio-Plastic) offers many possibilities for the industrial-arts program. The illustrations show the co-operation



Utility saw

Left – Mixing the plastic; right – pouring the foundation slab

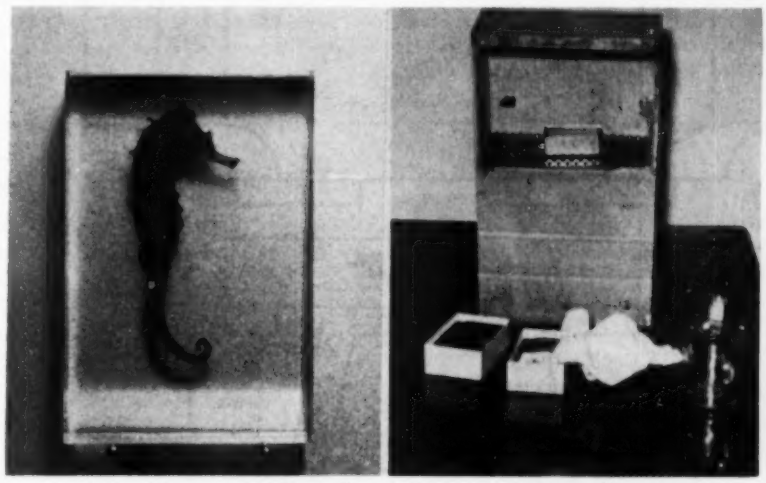
between the shop and science classes to prepare a mount as a visual aid. Frequently elementary school students do not enjoy the disagreeable odor of preservatives. Disintegration of materials is also a limitation of using preserved materials in school. The embedding of specimens in plastic can eliminate both problems and yet permit careful observation and study by the students. The procedure is simple enough for elementary students, yet intriguing enough for high school classes.

After adding a few drops of hardening agent, the liquid plastic is poured into a mold and heated to a temperature of 110°–115°F. for a period of 30 minutes. The result is a clear hard block of plastic. The specimen is then placed on this block in the mold. Another quantity of the liquid plastic is added and the process continued until the specimen is completely covered. Shrinking on cooling, the mount drops out the mold easily.

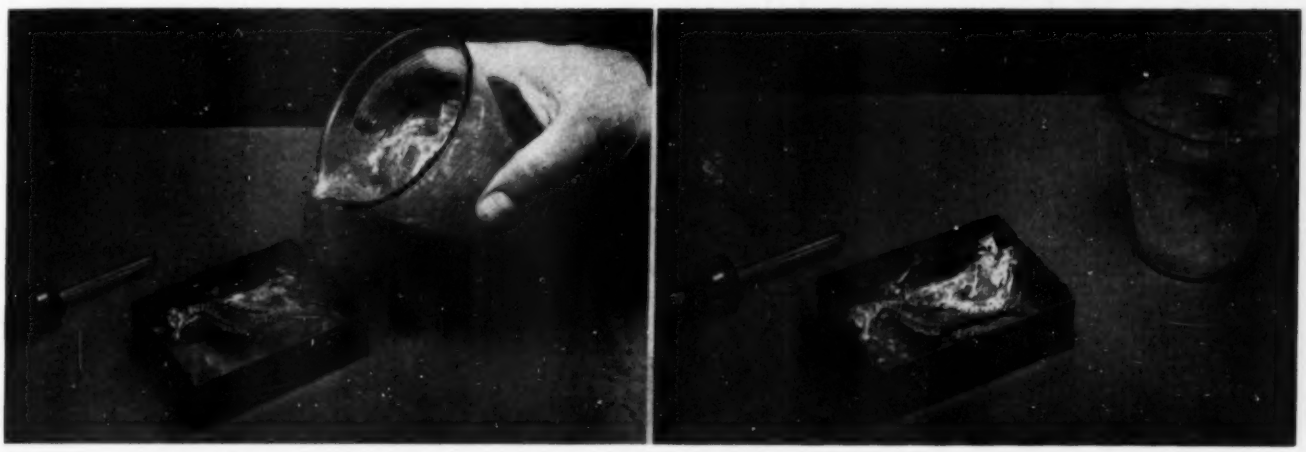
Caution should be used during the heating process. Too rapid heating or too high a temperature will cause the plastic block to crack. Our eighth-grade students made their own oven using the heat from two 220-Watt bulbs, thus assuring the low heating temperature over a long period of time.

Finished mounts can be used with the opaque projector to permit viewing by a larger audience. The use of plastics for embedding specimens and objects can add interest to the shop program and add valuable instructional materials to the growing list of visual aids.

The project need not be limited to embedding specimens. Student collections of coins, stamps, rocks, pictures, shells, may be used, or even service ribbons of older brothers.



Left – The mounted specimen; right – student-made oven



Left – Placing the specimen on the foundation slab; right – complete model, ready for the oven

One student made an interest picture with his brother's picture and service ribbons embedded in the plastic. Use of plastics offers interesting possibilities for the industrial-arts teacher. The thermosetting clear plastic gives the elementary and junior high school student many opportunities for using the material in the shop and develops an interesting hobby for leisure time.

The person of tomorrow must have ability to live with himself. This assures inner strength to do what is right in material and human relationships. Its fruits are peace of mind and serenity of being.—*Roger M. Kyes, Vice-President, General Motors.*

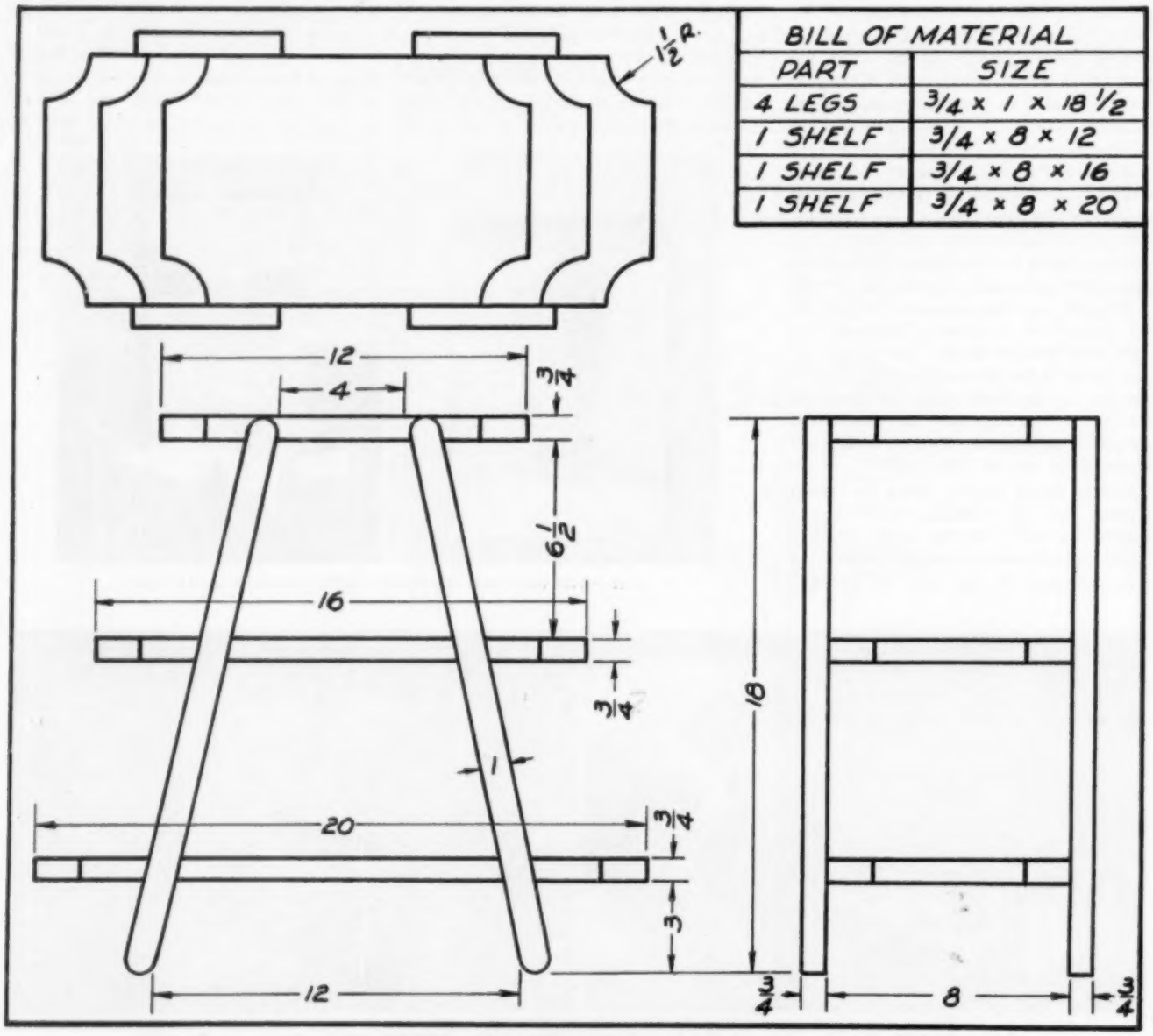
MAGAZINE AND CURIO TABLE

I. M. FENN
Chicago, Ill.

This project is simple in design, easy to construct, and will be welcome in almost any home or office. It is excellent for miniatures, small plants, candy dishes, ash trays, and many other fine items. Instructors will find that this project will help teach the students many of the fundamental woodworking processes. Walnut or mahogany is preferable, but any wood available is suitable. Several pieces may be glued together to make the three shelves.

Directions

Study the drawing and then obtain the several pieces listed in the bill of materials. Prepare the four legs by sawing, squaring, and shaping according to the dimensions in the drawing. Lay out the shelves and cut, square, and shape to size. Sandpaper all the parts before assembling. Attach all the pieces with glue and screws, or dowels if desired. Using dowels will give the students a valuable experience. Finish with stain and shellac, varnish, lacquer, or natural, depending upon the wood used, and the desire to match it with the other pieces of furniture. This project will make a practical and sturdy piece of furniture. A pair may be used as end tables in the living room.



BILL OF MATERIAL	
PART	SIZE
4 LEGS	3/4 x 1 x 18 1/2
1 SHELF	3/4 x 8 x 12
1 SHELF	3/4 x 8 x 16
1 SHELF	3/4 x 8 x 20

Details of magazine and curio table

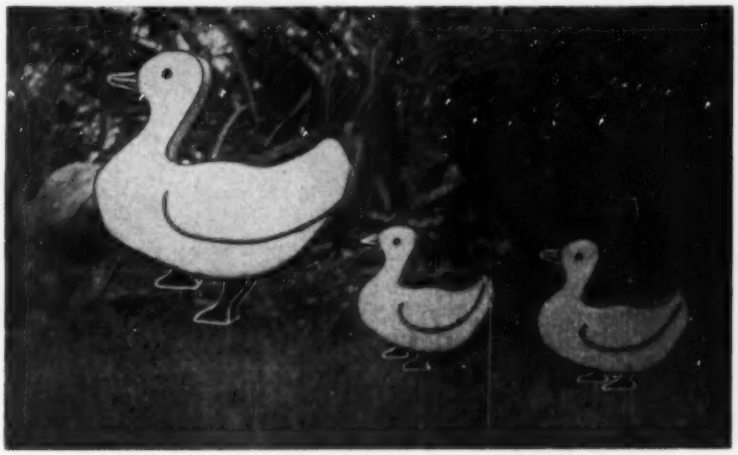
Experiences

Reading of drawing, choosing the wood, sawing, squaring, gluing, filing, shaping, boring, sanding, fastening, and finishing.

A LAWN ORNAMENT

HAROLD O. AKESON
High School
East Orange, N. J.

The duck, with a family of ducklings, makes an attractive lawn ornament and an interesting project. It has several good features and they are not difficult to make nor to paint and the entire job will not consume much time. They are especially good to use either during or at the end of the school year when time is lacking for a more complicated job. It is a project that could be suited to the ability of a student that does not have the skill required for a more difficult enterprise. It is economical as it does not require much material. Making the large duck calls for the only substantial piece of stock but the small ducks can be made from scrap pieces of wood which are usually available in the shop.



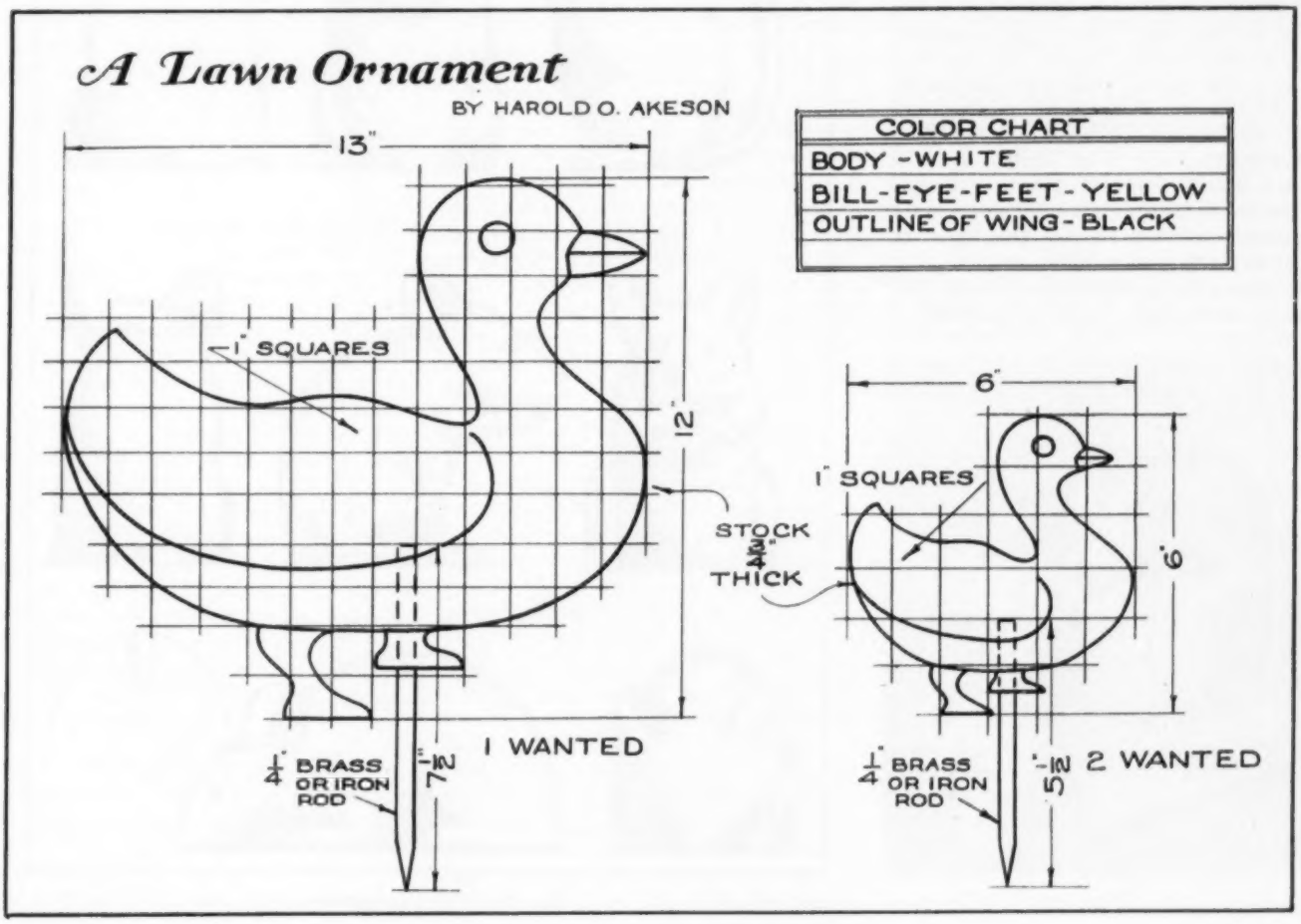
Lawn ornament by Harold O. Akeson

The shape of the ducks can be either laid out full size on paper for a pattern or drawn directly on the wood. The illustration covers all the dimensions and details.

Band saw the pieces, cutting slowly to give a smooth edge. The edges are further smoothed with the necessary hand tools and all surfaces should then be sanded.

At this point it is well to drill the ¼-in. hole in the edge of the duck's foot for the support, to set it upright in the ground. Support the object in the vise with pieces of scrap wood on each side to protect the surfaces while drilling the holes.

The material for the posts should be ¼-in. iron or brass rod. Sharpen one end of the



rod so that it can be pushed into the ground easily.

When painting be sure to have the first coat a flat white. Rub down when dry with fine sandpaper. The succeeding coats of paint should be a good outside white in order to stand up against the elements. To aid the student to paint in the details on the ducks, a stencil could be made that would simplify this particular part of the work. Any device that helps the student to produce a better grade of workmanship is always satisfactory. Painting a project is usually a discouraging phase of shopwork unless well organized or supervised. It has spoiled many a good job.

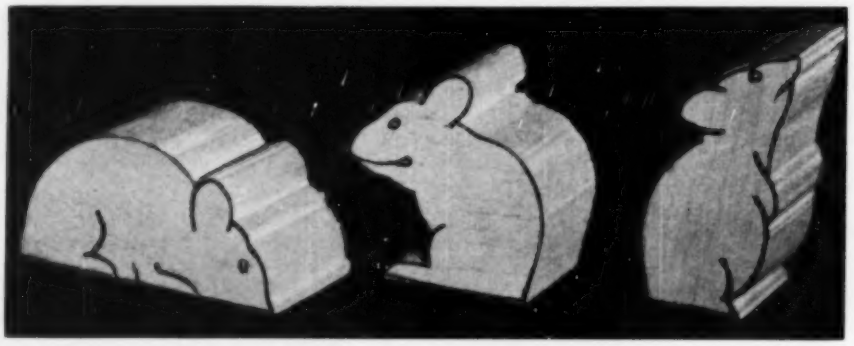


Fig. 1. The silhouettes of the mice

THREE MICE

BEN HUNT
Hales Corners, Wis.

The three little mice, described here, when set up in a group similar to the one shown in Figure 4, make good conversation pieces. The mice look very realistic, since they are actual size. The silhouettes should be sawed out of 1¼-in. pine or basswood. See Figure 1. It will not take long to whittle them out and sand them.

Figure 2 shows one roughed out at *A*. The one that has been whittled down is pictured at *B*, and *C* shows the one that has been sanded. The eyes are made by pressing the end of a nail set into the wood. The tails are made of ⅛-in. rattan such as is used for basket making. They may be left straight or can be put into boiling water for a minute or two, and then shaped to suit. Cut a small groove in the bottom as shown in Figure 3, after which the tail should be glued in place.

Coloring is very easy as the mice are gray except for the bellies, which are quite light in

Fig. 4

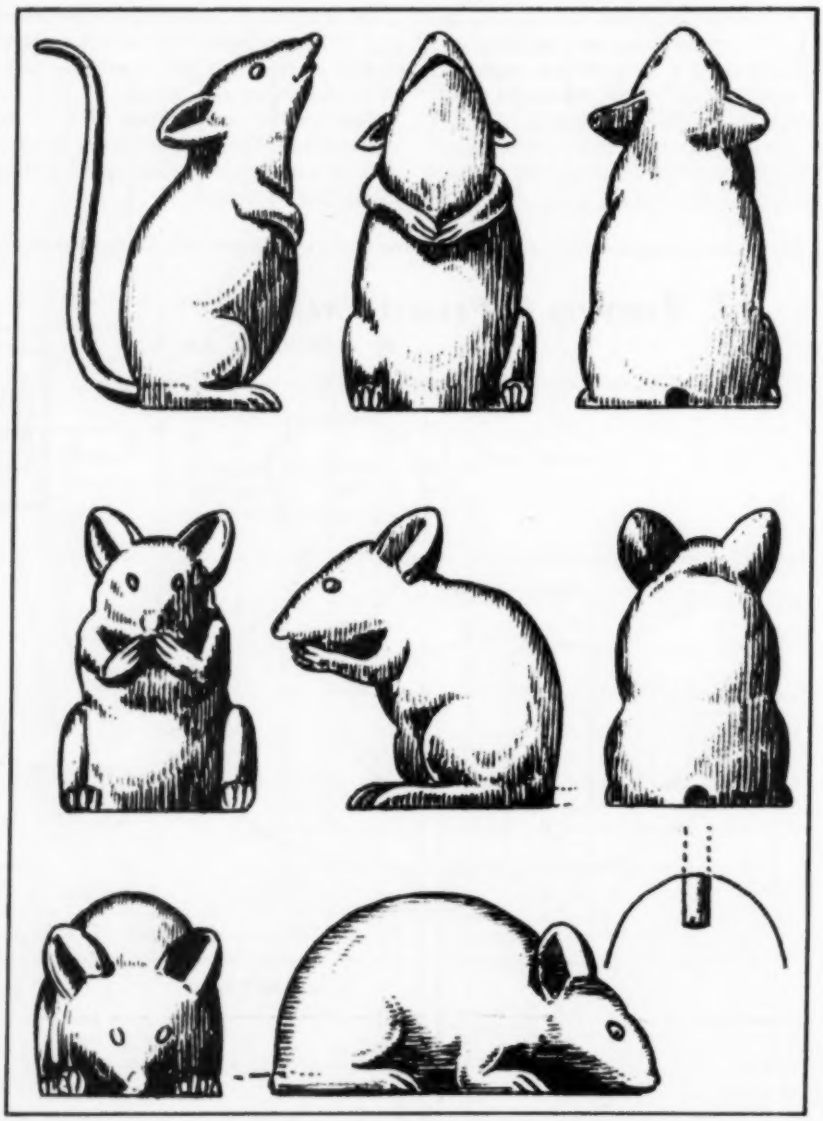


Fig. 3. Full-size patterns

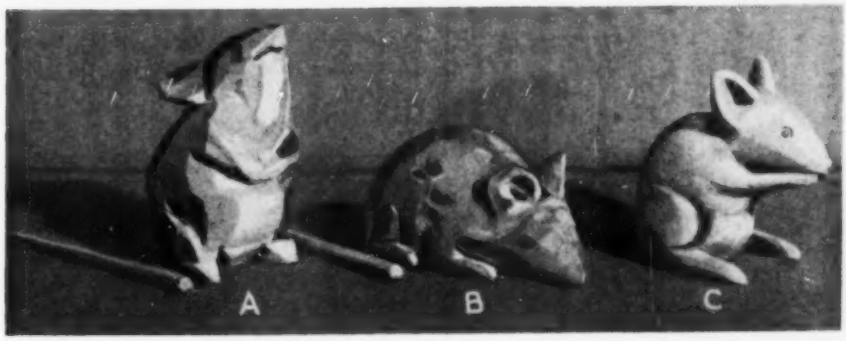


Fig. 2. Three little mice in various states of completion

color. The insides of the ears and the toes have a pinkish cast and the nose and eyes are black. To keep that natural look, do not lacquer or finish with any sort of varnish. The finished piece should be dull.

Figure 3 shows the full-size patterns which can be used for marking out the silhouettes, and Figure 4 shows how the little mice may be set up into an interesting group.

DO YOU TEACH GROUNDING?

JAMES A. SAYER
Electrification Adviser
Northern Electric Cooperative Association
Virginia, Minn.
Formerly, Industrial Arts Instructor
East Chain Consolidated School
Guckeen, Minn.

Safety is a universally accepted part of all teaching units in school shop work. Electrical safety is deemed important, but the stress is practically always on the proper methods of taping, soldering, and other wiring problems. Very little, if any, is ever said about the proper grounding of machines and motors. This is especially true of portable tools that have become so popular in the past few years.

These tools are now used in all types of construction, assembly lines, automotive shops, and in the home and school shop. The increased use of electrical equipment on inadequate wiring and the widespread sale of electric tools that are used for jobs heavier than they were designed for or those not approved by Underwriters Laboratories obligates all shop teachers to set an example in their shops and to teach their students proper grounding methods.

The Code on Grounding

The National Electric Code is quite clear in this respect and should be followed except where local regulations supersede the Code. Portable tools that operate on 115 volts are not covered, except that it is recommended that they be grounded. All machines operating on circuits carrying currents over 150 volts are adequately covered by the Code. All teachers of shop subjects should become familiar with the sections on motors and grounding that apply to their situation.

An electrical ground for our purposes can be considered as anything conductive that makes contact with the ground or at least is somewhere near ground potential. This will include water and steam pipes, heating ducts, metal raceway and conduit, metal lath in some cases, exposed steel beams or columns, damp wood, concrete laid on the ground, and the neutral wire of the wiring system. The earth is always considered ground whether it is wet or dry. If it is possible or even conceivable that a person may come in contact with any ground and an electrical machine, then that machine should be grounded. If anyone operates a machine that isn't grounded, he is betting his life that the electrical parts of the machine are in perfect condition. If properly grounded the danger is almost entirely eliminated. Frames of electrical machines and motors should also be grounded to eliminate static shocks. Although these are not fatal they certainly can be very unpleasant.

How to Ground Machines and Motors

Grounding can be accomplished in several acceptable ways. For stationary machines both the machine and motor frame should be grounded to a water or steam pipe, driven ground rod, or where permissible a neutral wire of the electrical system. Many areas permit the use of the neutral wire and in some places it is required. This type of grounding may be done by running a third wire from the fuse panel to the machine, or by connecting directly to the neutral at the machine. It is best to check local regulations before using either of these methods. This third wire is usually green. In all cases the ground should be continuous. No switches, fuses, or other interruptions should be put in the ground circuit. The Code does permit it to be switched if at the same time the *hot* leads are disconnected.

Portable motors by their very nature present an entirely different problem. All reputable manufacturers usually provide these tools with a 3 wire connecting cord with some type of clip or screw on the grounding wire at the plug end. This is where our lack of teaching electrical safety really shows up. Very few people ever use this third wire while most of them cut it off because they feel it is in the way. The tool end of the third wire is fastened to the frame of the machine. Then if any of the motor windings should short out to the frame the current will be grounded. However, if the wire at the plug isn't grounded and you are, the chances are very good that you will receive a very severe shock that is fatal in many cases.

The easiest way to correct this is to install a polarized laundry receptacle at all 115 volt outlets in your school shop. Encourage your students to do this for all outlets in their homes where a portable tool may be used. A good point to stress here also would be making sure the washing machine was provided with a grounded outlet, wire, and receptacle. This type of outlet will take either the polarized plug or an ordinary two prong plug. The polarized plug has a third prong that is connected to the third wire, the green one, which is connected to the motor frame. In the outlet the third screw is connected to the neutral wire or a special ground wire. The result is that every time the machine is plugged in it is automatically grounded.

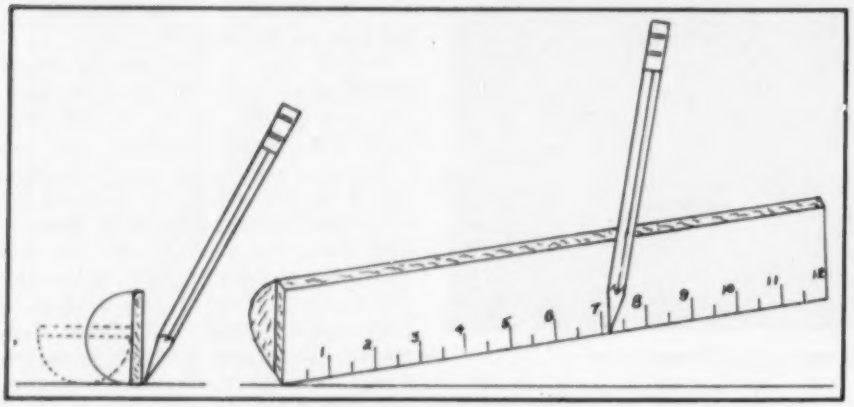
If this type of safety program is carefully carried on the number of deaths resulting from electrical shocks around motor driven machines will be practically eliminated. If proper grounding is not taught some of our students are going to be electrocuted eventually. Their only crime will be the lack of knowledge of proper grounding. This we are responsible for. As teachers we must teach safe working habits.

TEACHING AID FOR PROPER HANDLING OF THE FLAT FOOT RULE

IVAN HOSTETLER
Head, Department of Industrial Arts
North Carolina State College
Raleigh, N. C.

Beginners in woodworking courses will be aided in proper handling of the flat foot rule, if it is attached to a half-round piece of stock as shown in the accompanying illustration.

Very often these woodworking students take the path of least resistance and use the rule while it is resting on its widest surface.



Aid for teaching the use of the rule

Obviously, accurate measurements cannot be made using the rule in this manner. Variations of from 1/16 to 1/8 in. will be made depending upon the angle at which the observer is viewing the rule. Since normally the beginner will not always view his work from the same angle, cumulative errors will inevitably result if a large number of measurements are to be made for a given project.

To offset the tendency for using the rule in a flat position, fasten it to a piece of half-round stock, using two wood screws as shown. The rule can then be used only if it is held on its edge. The graduations of the rule will bear directly on the surface to be measured which is more likely to insure accurate measurements. The result is greater satisfaction for the student in finding that pieces seem to fit "just right" on first trial.

NIGHT STAND

HERBERT W. YANKEE

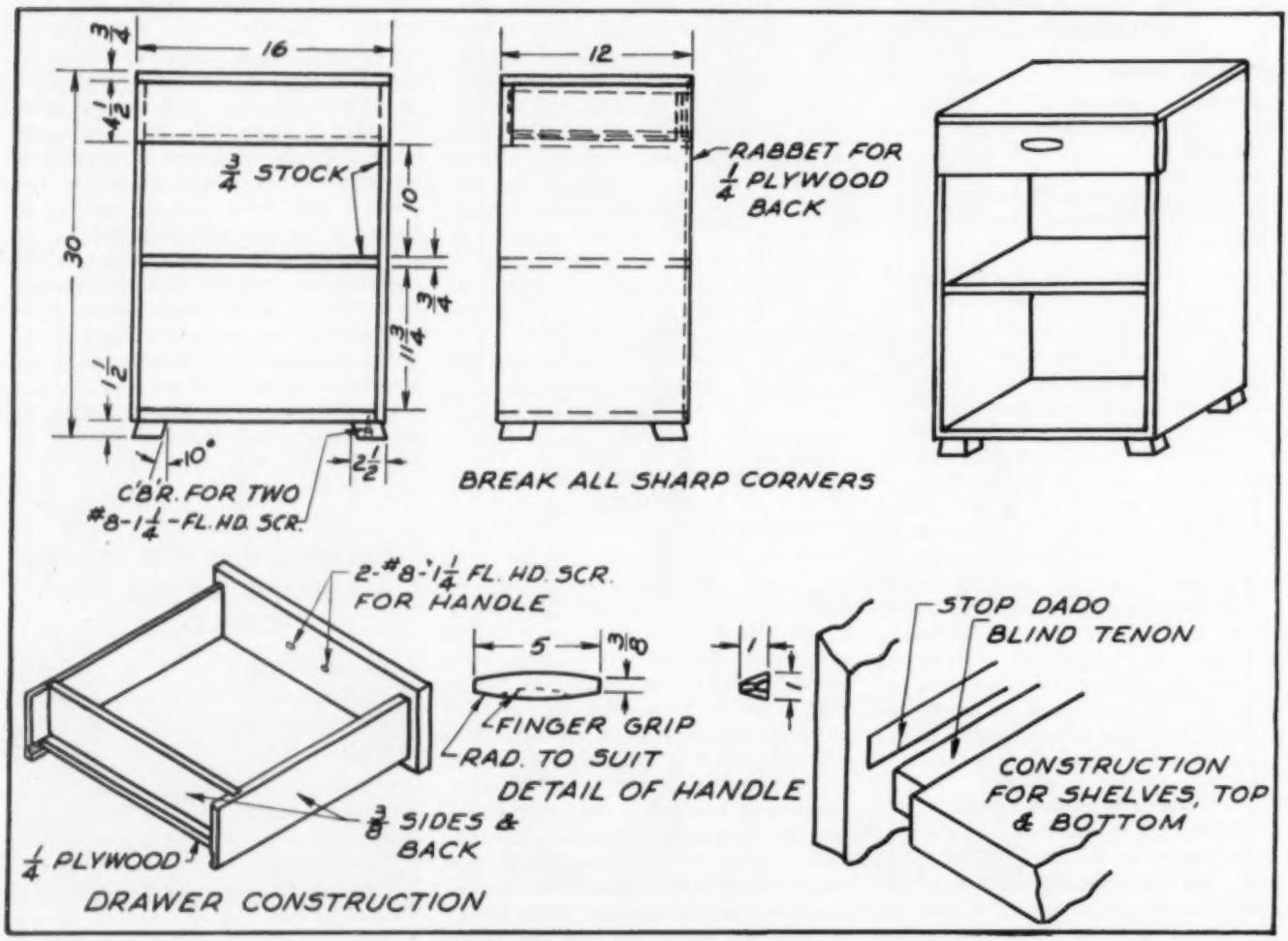
High School
Stratford, Conn.

The night stand described herein is a tested woodworking project and has been made successfully by over 100 ninth- and tenth-grade boys.

Construction features include a drawer, rabbet for back, and dados for the sides, top, and bottom. Many hand tools can be used in the making of this project. A dovetail slide may be added to the drawer bottom if desired.

The night stand is especially attractive if made in mahogany or bleached oak with the treatment of finish optional. All corners are to be slightly rounded.

The night stand is adaptable for use in bedrooms for book storage or radio or for use in a living room.



Night stand by Herbert W. Yankee

CHECKING SCHOOL OWNED EQUIPMENT

PAUL C. HOOPES
Abraham Clark High School
Roselle, N. J.

The well-organized drawing room must, as a matter of course, have a place for everything and the student should find everything in its place in serviceable condition. Eternal vigilance in checking equipment must take place and be done in a manner which throws responsibility upon each student. Checking may become such an involved performance that the system soon kills itself. Simple methods which tell at a glance the condition and location of equipment are, therefore, desirable. The schemes described in this article are recommended because they satisfy the demand for the desired simplicity and speed.

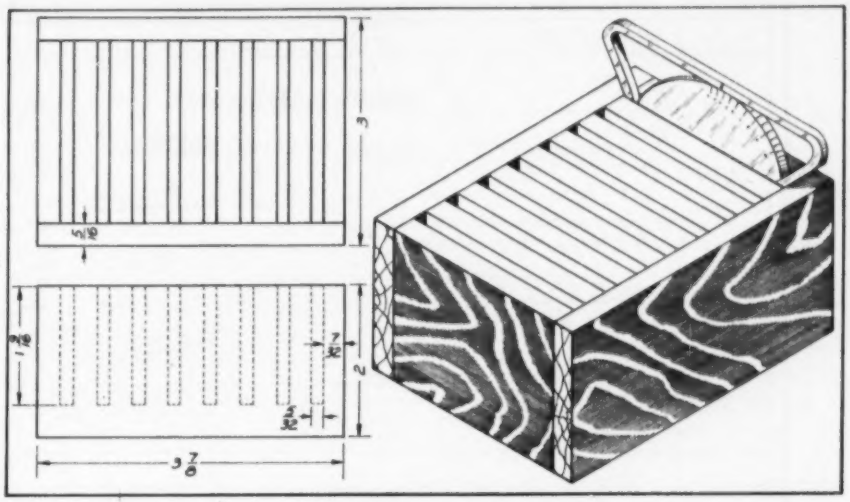


Fig. 1. Block for Ames lettering devices

Ames Lettering Device

The block shown in Figure 1, holds eight Ames lettering devices. This has been found to be a sufficient number for a class of 24 pupils. More space may be provided if that is necessary. The block is a simple affair having a series of circular saw kerfs with ¼-in. sides tacked and glued on. One can tell at a glance whether all of the devices have been returned.

Key Blocks

Many arrangements have been marketed for filing keys. Twenty-four drawing desks, each equipped with six locked drawers require the filing of 144 keys. The key block shown in Figure 2 has the advantage of being easy to make, of permitting the ready distribution of keys to a class by the instructor or a pupil, and of being readily placed in a drawer and locked up.

The system used for identifying keys and their locks is simple. Consider the key for the third drawer in desk seven. This would be stamped with *73* — seven meaning the desk number, and three the drawer of that desk. This key would be found in a block bearing a large *3* on the ends and sides, as there are only six drawers to a desk, it is logical to organize the keys in their *drawer number* groups; thus we have six blocks each containing 24 keys, or more if a greater number of desks are used. Each key has an opening in the block designated by the desk number. Desk number appears on the top surface of the block.

The simplest method of making a set of key blocks is to dado slots for the keys on one face of a 1½-in. strip, being sure to space uniformly. When cut to length and glued in block form, one piece without dados is placed on the outside.

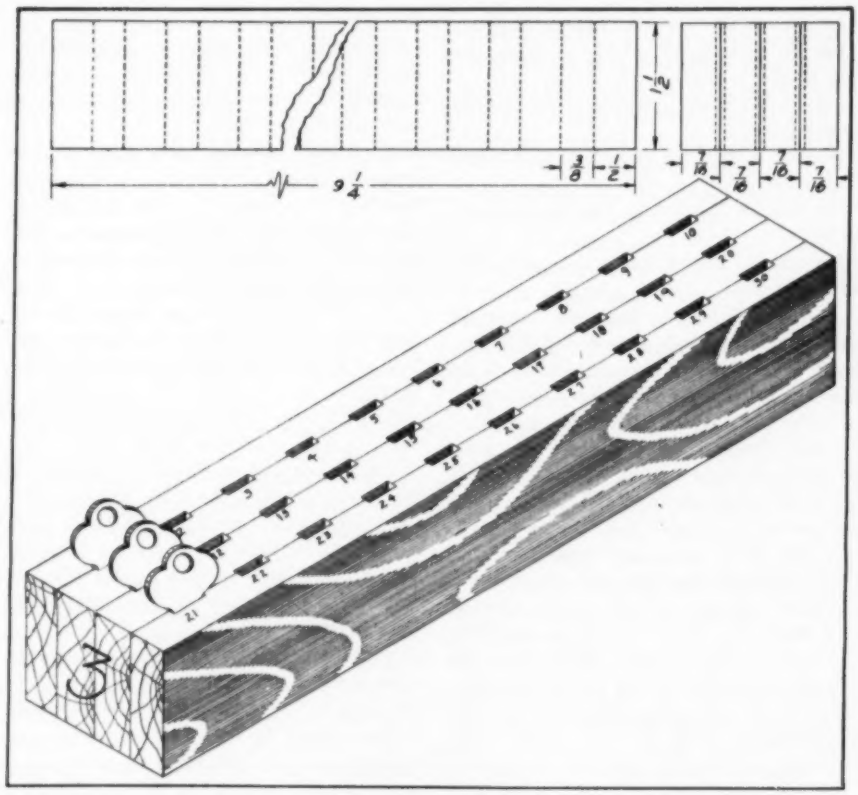


Fig. 2. Key block

Drawing Instrument Cases

Checking sets of drawing instruments in their cases has long been a problem. What was needed was a case with a transparent top or lid. Open boxes are not satisfactory because of the danger of spilling the contents. In this school pocketbook type cases had been bought with the instruments in them. These lasted about three years. Because of the difficulty of checking, some parts were either lost or stolen, and the cases worn out. The old flaps were torn from the plush covered block containing the pocket for the instruments and shallow boxes with a groove for sliding lids were made to fit these blocks. Next a sheet of Du Pont Pyralin, gauge .060, color 7511 was secured for the lids. This was sawed to size on a circular saw, using a crosscut

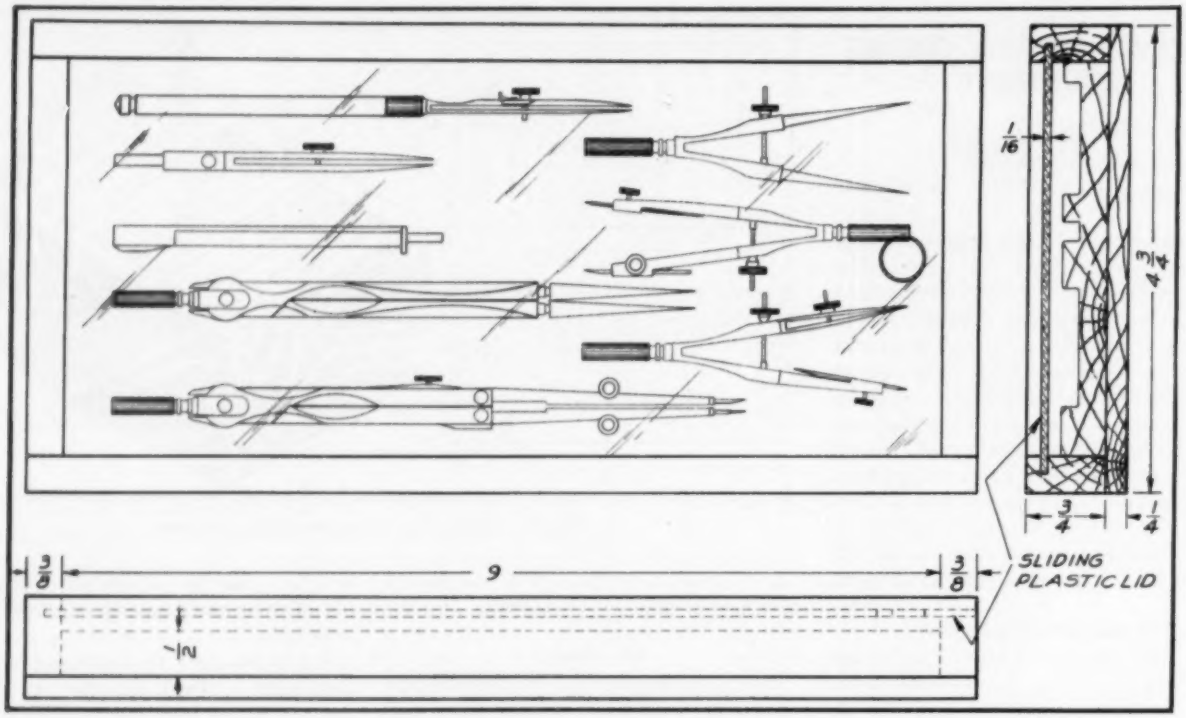


Fig. 3. Drawing instrument box

blade with medium set. A finger hole was bored through each lid with a ½-in. Forstner bit. Care must be taken not to feed the bit too fast if the holes are bored on a drill press. The edges were smoothed on a grinder wheel or fine sander. The sketch will show how the boxes were constructed in further detail. These boxes have proved highly satisfactory, and since their use no losses have occurred and the instruments have been found to be in better condition.

A UNIT ON THE USE OF THE HACK SAW

G. M. ATMORE

Santa Paula, Calif.

1. *Definition:* The hack saw is used for cutting metals with a tempered saw blade supported in a steel frame. This sawing may be done both by hand or by machine.

2. *The Hack Saw and You:* This tool is a common one in the machine shop, garage, or home shop. Where the cutting of metal is required the hack saw is usually the tool used. Frequently the hack saw is not used correctly. Probably no other hand tool is more misused than the hack saw, yet to use it correctly is very simple.

3. *Some Things You Should Learn About the Hack Saw:*

Job No. 1. How to use the hack saw safely

Job No. 2. How to install a hack saw blade in its frame

Job No. 3. How to cut a piece of aluminum

Job No. 4. How to cut a piece of copper

Job No. 5. How to cut a piece of cast iron

Job No. 6. How to cut a piece of brass

Job No. 7. How to cut a piece of flat mild steel

Job No. 8. How to cut a piece of thin sheet steel

Job No. 9. How to cut a piece of small water pipe

Job No. 10. How to cut a piece of exhaust tubing

Job No. 11. How to cut a piece of untempered tool steel

4. *Other information:* Hack saw blades are made of different kinds of steel, and they may have a wide variety of coarse or fine teeth per inch. The softer the metal that is to be sawed, the fewer the number of teeth per inch need be used. Pure aluminum, being very soft, the hack saw blade used for sawing it, should have 6 or 8 teeth per inch, and the saw blade does not need to be of high tempered steel.

On the other hand some metals, such as nickel steel, are very hard, and so require a hack saw blade with 24 teeth per inch and the blade must be made of a very fine grade of steel with a high temper. Mild steels are softer than nickel steel and harder than pure aluminum so the hack saw blade for mild steel would be about 18 teeth per inch and the blade need not be very highly tempered.

The speed (strokes per minute) of the hack saw is very important. Too fast a speed will cause the blade to become too hot, thus taking out the temper from the teeth and causing the blade to become dull. *The correct speed is a stroke a second.*

The length of the stroke is to be *complete.* Use all the teeth possible. Each stroke is to be made from one end of the blade to the other end of the blade.

The pressure on the blade is to be *just enough* to keep the teeth cutting and no more. Too light a pressure will cause the teeth to *slip* over the metal and wear themselves dull. Too great a pressure will cause the blade to bend, and the teeth to break.

Do not rock the hack saw. Doing this will cause one tooth only to cut at a certain time. This rocking of the hack saw will break out the teeth.

Keep the hack saw on a level plane. Do not rock it like a rocking chair.

The hack saw blade should be tightened in the frame to where the blade will not bend from side to side when it is used. If the blade is too tight the hack saw frame will be pulled out of line. It is difficult to explain just how tight the blade should be. Moderately tight is the answer.

Install the blade so the teeth point forward as on a wood saw.

Job No. 1. How to use the hack saw safely

There should be very little danger in using the hack saw. The teeth are sharp and produce a ragged cut if forced into the finger. Report any cuts to the instructor for treatment.

Job No. 2. How to install a hack saw blade in its frame

Step 1. Obtain a hack saw blade with 6 or 8 teeth per inch and a hack saw frame.

Step 2. Install the blade so the teeth point forward. Tighten to a moderate tension.

Step 3. Show instructor.

Job No. 3. How to cut a piece of aluminum

Step 1. Obtain a piece of aluminum and a hack saw frame equipped with a blade having 6 or 8 teeth per inch.

Step 2. Clamp the piece of aluminum in the vise and have the instructor show you how to use the saw. Then cut off a piece yourself.

Job No. 4. How to cut a piece of copper

Step 1. Obtain a piece of copper and a hack saw frame equipped with a blade having 10 or 12 teeth per inch.

Step 2. Clamp the piece of copper in the vise. Take full strokes without rocking the saw and use *just enough* pressure to cut. *Make one stroke per second.* Cut off a small piece of copper.

Job No. 5. How to cut a piece of cast iron

Step 1. Obtain a piece of cast-iron and a hack saw frame equipped with a blade of 14 teeth per inch.

Step 2. Insert the piece of cast iron into the vise and cut off a *small* piece.

Job No. 6. How to cut a piece of brass

Step 1. Obtain a piece of brass and a hack saw frame equipped with a 14-teeth per inch blade.

Step 2. Cut off a small piece of brass, just as you cut off the copper.

Job. No. 7. How to cut a piece of flat mild steel

Step 1. Obtain a piece of flat mild steel and a hack saw frame equipped with a 18-teeth per inch blade.

Step 2. Place mild steel in the vise flat side up and cut off a small piece.

Job No. 8. How to cut a piece of thin sheet iron

Step 1. Obtain a piece of thin sheet iron and a hack saw frame equipped with a 18-teeth per inch blade.

Step 2. Place the sheet iron flat side up in the vise. Make strokes *full* without *rocking* the saw with *just enough* pressure to cut at *one stroke* per second. Cut off a small piece.

Job No. 9. How to cut a piece of small water pipe

Step 1. Obtain a piece of small water pipe and a hack saw frame equipped with a 16-teeth per inch blade.

Step 2. Use same method as before and cut off a small piece.

Job No. 10. How to cut a piece of exhaust tubing

Step 1. Obtain a piece of exhaust tubing and a hack saw frame equipped with a 24-teeth per inch blade.

Step 2. Clamp exhaust tubing in the vise.

Step 3. Turn the hack saw frame end for end.

Step 4. Cut off a small piece of exhaust tubing.

Job No. 11. How to cut a piece of untempered tool steel

Step 1. Obtain a piece of untempered tool steel and a hack saw frame equipped with a high tempered blade of 24-teeth per inch.

Step 2. This is tough steel. Strokes ***must be slower*** and be sure to apply enough pressure to make the blade cut. Cut off a small piece. *Do not let the blade slip over the metal. Keep the blade cutting. Use hack saw the regular way.*

Step 3. Show all hack saw blades to the instructor

Now: You will be asked to answer questions covering hack sawing. It is advised that you reconsider the experience you have had in this unit of work.

Next: Ask the instructor for the "Check Sheet for Hack Sawing."

Check Sheet for Hack Sawing

16.6

Multiply by the number of correct answers %

1. Hack sawing faster than one stroke per second will cause the blade to (*a*) become too hot and destroy its teeth, (*b*) cut better, (*c*)last longer. (*a*) *b c*
2. Rocking the hack saw will cause the blade's teeth to (*a*) cut faster, (*b*) operate hotter, (*c*) be torn out *a b* (*c*)
3. The correct pressure on a hack saw blade is (*a*) very light, (*b*) very heavy, (*c*) just enough to keep it cutting. *a b* (*c*)
4. The correct number of teeth per inch is determined by the (*a*) hardness or softness of the metal to be cut, (*b*) size of metal, (*c*) shape of metal. (*a*) *b c*
5. The tension of the blade in the frame is (*a*) not important, (*b*) should be correct, (*c*) determined by the number of teeth per inch. *a* (*b*) *c*
6. To hack saw correctly the blade must have the correct number of teeth per inch. The correct pressure must be applied. The frame must not be rocked, and the (*a*) blade must get hot, (*b*) strokes must be full, (*c*) blade must become dull. *a* (*b*) *c*

The letters in parentheses in the right-hand column indicate the correct answers to this test. Percentage is determined by using the form in the upper right hand corner.

Show results to the instructor.

TREASURE CHEST

FRANCIS J. COSTA

Joan of Arc Junior High School
New York, N. Y.

Square two pieces of wood (white pine) ½ by 2 by 6½ in. Square two pieces of wood for ends ½ by 3 by 4½ in. Use pattern for cutting curved end.

Nail and glue four pieces together with No. 19 by 1-in. brads. Place the brads ¼ in. from ends and sides.

Square bottom, then glue and nail it to the frame. For top of treasure chest cut ⅝-in. wide strips of ½-in. stock and cut to proper length. Plane a slight taper on each piece, glue sides, and nail. When the chest is nailed, sand all over with No. 1 and No. 0 sandpaper.

On the four sides of the box lay out ½-in. lines starting from the bottom up. This can be done with either a marking gauge or try square. With a backsaw cut on these lines to a depth of ⅛ in. Widen these saw cuts to a V shape with the corner of a flat wood file. The same operation is applied on the top of the treasure chest. Measure 2 in. from the bottom of the chest. Mark on four sides and cut lid with a backsaw.

Place a full sheet of No. 1 sandpaper on table and sand surfaces of top and bottom until they are even.

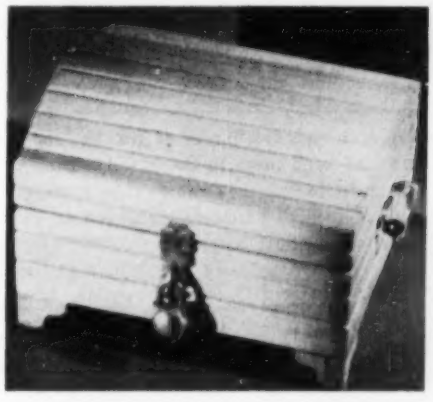
Attach top and bottom of chest with 1 by ¾-in. brass hinges.

Legs

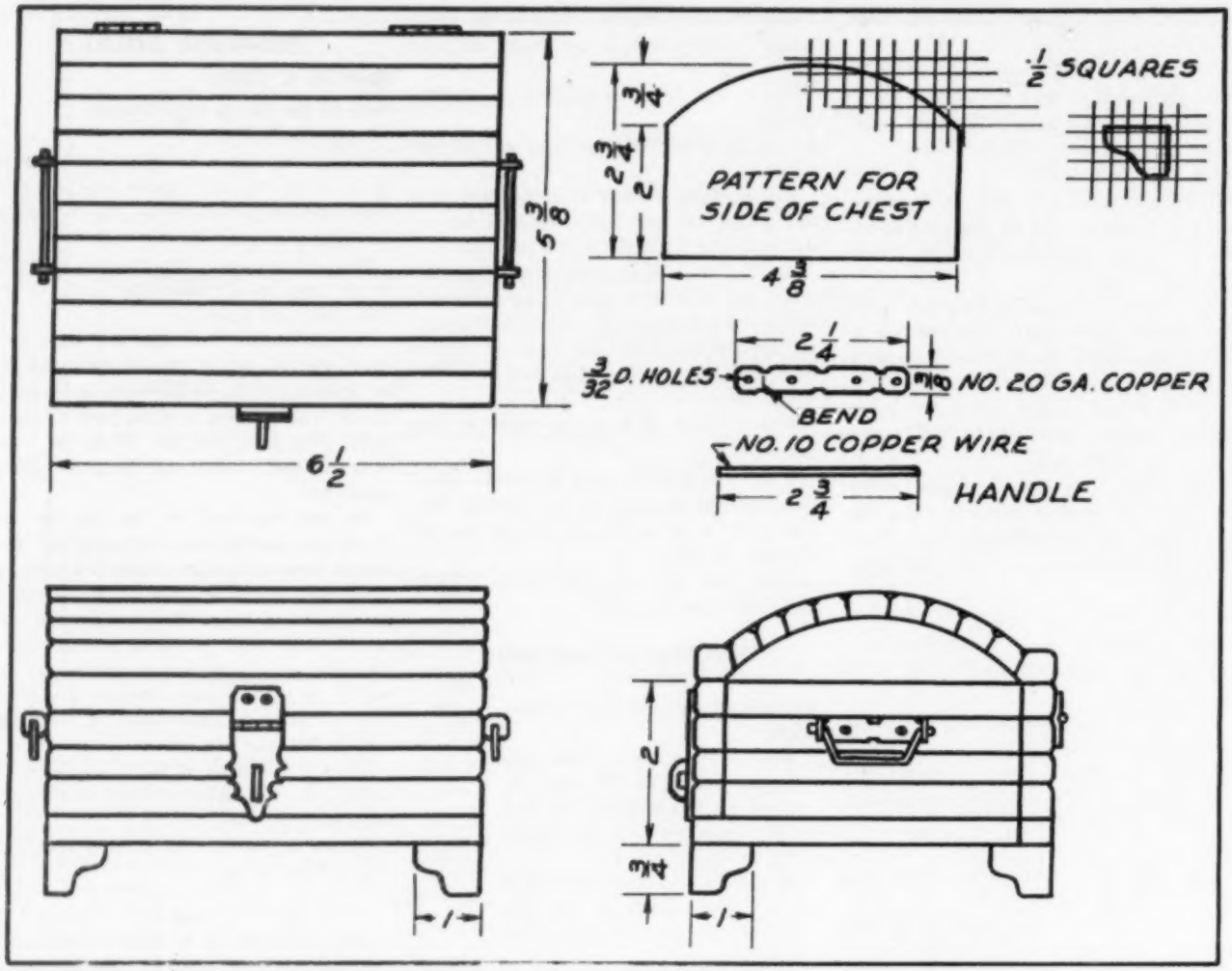
Cut four pieces of ¾ by 1 by 1-in. stock. File and sand all sides. Lay out pattern on each block, cut with coping saw, file and sand each foot. Glue and nail to the bottom of the chest.

Buy an ornamental brass hasp in a hardware store and attach to chest.

Handles are made of No. 18 or 20 gauge copper. Cut to size with tin snips and shape with 6-in. round and flat files. Drill 3/32-in.



The finished treasure chest



Details of treasure chest

BILL OF MATERIAL

No. of pcs.	*Name*	*Material*	*Size*
2	Sides	Wood	½ x 2 x 6¼ in.
2	Ends	Wood	½ x 3 x 4½
9	Top	Wood	½ x ⅝ x 6½
4	Legs	Wood	¾ x 1 x 1
2	Hinges	Brass	¾ x 1 in.
1	Ornamental hasp	Brass	¾ x 1½ in.
2	Handles	No. 18 sheet copper	⅜ x 2¼ in.
2	Handles	No. 12 copper wire	2¾ in.

from each end. Cut pieces of No. 12 copper wire, and bend them to shape and assemble.

In order to give the treasure chest a proper finish remove all hardware except hinges and finish to individual taste.

Over a recent 12-month period, some 500 new petrochemicals appeared on the market and went into the service of industry, agriculture, and the home. — *Petroleum Newsnotes*

Discipline in the Shop

WALTER L. AMBROSE
Patrick Henry School
St. Louis, Mo.

Discipline is something that may make or break a new teacher or a teacher in a new situation. It is something that all of us could use more of in order to do an effective job in teaching. Discipline is good teaching and good teaching is common sense. The next thing that may cross the reader's mind now is: "Why don't more of us use more of it?"

I rather like the definition of discipline given by Arthur Mays: "Discipline is controlled behavior which makes for progress and effectiveness." Below you will find 23 steps that may be considered as a start in securing good discipline.

1. Interest and understanding on the part of the pupil.
2. Careful planning by the instructor.
3. Suitable working conditions.
4. High degree of interest must be maintained.
5. Appropriate time values.
6. Be sure the student has an objective.

(Continued on page 40A)

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GENERAL ELECTRIC

our aims and objectives and what we are doing in industrial arts.

In April a tour of the Westinghouse Micarta plant and print shop is planned.

Credit for an outstanding year of activities goes to Earl Kuhn, vice-president and program chairman. — *Charles E. Williams.*

Personal News

DR. CLAUDE H. EWING APPOINTED TEACHER TRAINER IN INDUSTRIAL EDUCATION

Dr. Claude H. Ewing has been appointed professor of industrial education at the University of Hawaii. In this capacity Dr. Ewing will serve the needs of vocational school and industrial-arts teachers for professional courses and itinerant services as teacher trainer. Approximately one half of his time will be spent working with the Department of Public Instruction.

Dr. Ewing is well acquainted with the local situation having taught at the University of Hawaii during the 1948 and 1952 summer sessions, and having served as director of instruction and vocational education at the Kamehameha School for the past three years. He has made extensive contacts with local business and industry and is well informed regarding their training needs and the economy of the territory.

To his new position Dr. Ewing brings a rich background of training and experience. As a tradesman in his own right he entered the field of vocational education as a teacher in Milwaukee Vocational School, served as teacher and later as director of curriculum at Washburne Trade School, and climaxed his public school service in Chicago by serving as director of the Chicago Vocational School, a huge institution serving approximately 5000 students. In addition, Dr. Ewing has taught in a number of mainland colleges and universities during summer sessions, coauthored several books in the field of vocational education and has served as editorial adviser for nationally known publishing companies for a number of years.

He received his Ph.D. in education from Northwestern University and his master's degree from Colorado State College.

MR. F. M. GROSHONG DIES

Fred M. Groshong, supervisor of industrial arts in the public schools of Portland, Ore., from 1917 through 1941, passed away in Portland on

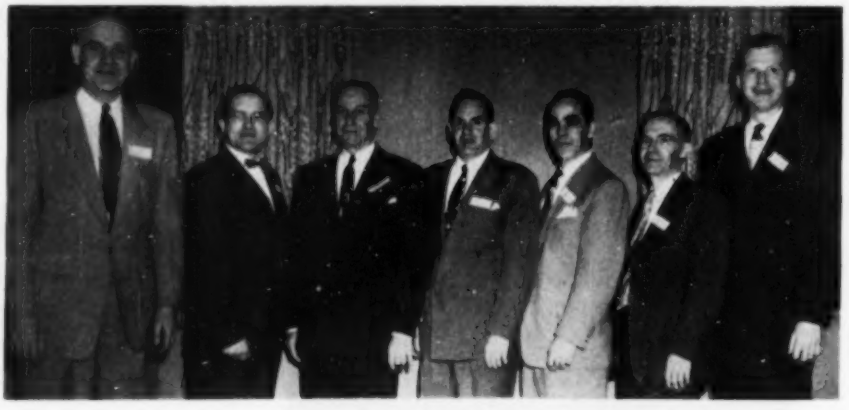
(Continued on page 28A)

ASSOCIATION NEWS

(Continued from page 6A)

Allegheny County Industrial Arts Association meeting at Brentwood, Pa.

Left to right: Charles Williams, treasurer; Joseph Kennedy, secretary; Robert Stucker; Donald Moon, president; Earl Kuhn, vice-president; Dr. S. L. Coover; Ralph Steeb, corresponding secretary



shops, the business session, and program. Mr. Stucker projected two excellent color filmstrips showing how the Hardwood Corporation prepares its lumber from trees to school shop.

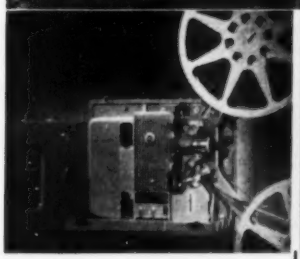
On March 25 the association held a "Men of Industry Night" at the Leetsdale, Pa., high school for the purpose of presenting to industrial leaders

Kodak announces . . .

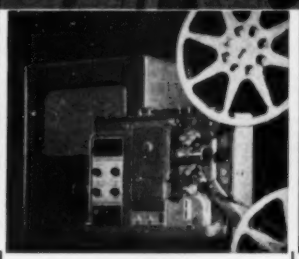
3 brilliant new Pageant models . . . and a heavy-duty silent projector for critical movie analysis

The Pageant is the projector that has revolutionized 16mm. sound projection . . . the first compact projector with the optical and tonal excellence of full-scale 16mm. equipment . . . the first to offer permanent prelubrication—an exclusive 16mm. feature that eliminates *completely* the chief causes of projector breakdowns!

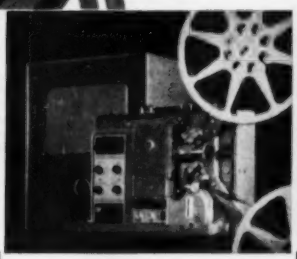
At just $400, the Pageant is still the economical top-choice projector for average 16mm. sound-and-silent projection. But now from Kodak have come four more projectors—each "tailor-made" to meet a particular 16mm. projection requirement. See your Kodak Audio-Visual Dealer about a demonstration—or use the check slip below for further information.



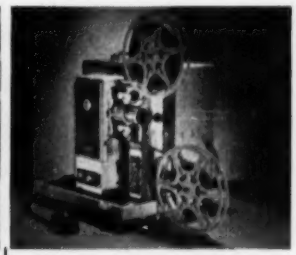
NEW Kodascope Pageant Sound Projector, Model AV-071, with Plus-40 Shutter A super-brilliant version of the standard Pageant, it incorporates an extremely efficient two-bladed shutter which provides vastly increased illumination—more than 40% greater than the sound-and-silent projector. Ideal for projection under difficult conditions . . . in hard-to-darken rooms, in halls or auditoriums . . . *wherever* extra image brilliance, long screen "throws," or unusually large picture areas are required. $400. *Sound projection only.*



NEW Kodascope Pageant Sound Projector, Model AV-151, with 15-watt amplifier Features an extremely high-fidelity amplifier, the extra capacity of the 12-inch Kodak De Luxe Speaker, and provision for the finest sound fidelity obtainable with a 16mm. portable projector. Ample power output and speaker capacity for auditorium projection . . . plus separate bass, treble, and fidelity controls for unmatched sound quality in cramped quarters as well as in spacious auditoriums. $530. *Sound-and-silent projection.*



NEW Kodascope Pageant Sound Projector, Model AV-151E, with Plus-40 Shutter and 15-watt amplifier Combines increased light output produced by Kodak's Plus-40 Shutter with the precise tone and volume features of the Model AV-151. No other portable projector gives you such brilliant screening—even on long throws—plus such excellent tonal quality at all volume levels. The Pageant, Model AV-151E, is capable of meeting *every* 16mm. requirement short of a theater-type installation. $530. *Sound projection only.*



NEW Kodascope Analyst Projector Heavy-duty silent projector designed to meet the critical requirements of 16mm. motion-picture analysis . . . ideal for such fields as time-and-motion study and sports analysis. Features a heavy-duty reversing mechanism operated from a remote-control switch on a 5-foot cord. Separate motor drives blower at constant speed, permitting *repeated, instantaneous* reversals without film or projector damage. With Daylight Projection Viewer, for desk-top movie study, $295. *Silent projection only.*

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NAME_____

ORGANIZATION_____

STREET_____

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(Zone)

Kodak

PERSONAL NEWS

(Continued from page 26A)

December 27, 1952. Mr. Groshong was graduated from Oregon State College in 1916. He had served as a teacher of industrial arts in the elementary schools for several years prior to graduation, then returned to his former position upon the completion of the bachelor's degree and was appointed to the supervisory position in the fall of 1917. He was recognized as one of the pioneers in the industrial-arts work in the public schools of Oregon, served on many local and state committees in the development of that work in the public schools of the state, and was very largely responsible for the development of a strong industrial-arts program in the seventh and eighth grades of the Portland elementary schools.

After retirement in 1941 Mr. and Mrs. Groshong traveled widely but maintained their home in Portland. Because of ill health in recent years, they had remained in Portland where Mr. Groshong was still active in professional organizations and devoted a great deal of time to public-spirited service in teachers' organizations. He was especially active in an effort to improve the retirement status of all Oregon teachers, serving particularly in the promotion of a residence fund for the benefit of retired teachers.

Mr. Groshong is survived by his widow and two daughters. — *G. B. Cox*

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A new leader in the medium price class. *Unbreakable* head and handle of glossy red "Tenite" make it a perfect choice for school shops. Ball bearing head, forged jaws, Barber chuck.

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One of the most popular bit braces ever made. Sturdy, boxed ratchet mechanism. Barber chuck with self-opening, forged steel jaws. Ball bearing, steel clad head of mahogany finished hardwood.

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Popularly known as the "Haldall," this fine quality brace is equipped with a universal type chuck holding square, taper and round shanks from 1/8" to 1/2" diameter. A brace that's hard to beat for all round school shop use.

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Preferred by expert craftsmen everywhere. A beautifully finished tool with full ball bearing construction, Lion universal type chuck, head and handle of fine grained tropical hardwood. All exposed metal parts heavily plated and highly buffed.

THREE ABERCROMBIE BROTHERS NOW RETIRED

Towne R. Abercrombie, formerly supervisor of the Washington Junior High School Shops, Cincinnati, Ohio, and author of *Applied Architectural Drawing*, published by The Bruce Publishing Company, in a recent letter wrote as follows:

"The third of my brothers is retiring this year. There were three of us who were graduated from Stout, 1910, 1912, and 1914. I think that it totals 113 years of teaching service. I doubt that there are many other brother combinations who remained in the teaching of manual training, then manual arts, then industrial arts and on into the field of industrial education. I guess that it was our foundation under such men as our old friend E. E. Sheldon, who was our high school mentor and who was responsible for the establishment of the old Webster Manual Training School at Omro, Wis., and then the unsurpassed leadership of such men as L. D. Harvey, George Buxton, Fred Curran, and others at Stout Institute. There have been many changes in practice and method during this period of over forty years, yet I think that we were able to adjust ourselves to the changes and must have contributed some little bit to the changing program. Maybe it is just sentiment, but I rather hate the idea that we, as a family, are through with the work of a lifetime."

The editor as well as many of the readers of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION agree with you that it is just too bad that a time arrives for good teachers to sever their connection with the work to which they devoted their lives, and to say good-by to the students whom they have tried so hard to prepare for their future work in the world.

Best wishes to the Abercrombie brothers for an enjoyable and restful future.

♦ DR. ROBERT LLOYD CANTOR has been appointed director of training for Ronson Art Metal Works plants throughout the country. He obtained his Ph.D. degree in the department of industrial arts and vocational education at New York University. He is also currently teaching part time at New York University in the industrial-arts department. He has taught at West Virginia Institute of Technology, Columbia University, and the City College of New York, and was former administrator of American Craftsman School.

Dr. Cantor has contributed many articles to INDUSTRIAL ARTS AND VOCATIONAL EDUCATION magazine and other professional magazines.

He is the author of several technical monographs, and has participated on the programs of a number of teacher's conventions.

He is a member of Epsilon Pi Tau, Phi Delta Kappa, a life member of the American Industrial Arts Association and the National Education Association, and a member of American Vocational Association, and the American Council of Industrial Arts Teachers Education Association.

♦ H. C. THAYER has been appointed Wisconsin state supervisor of trade and industrial education. He succeeds R. L. Welch.

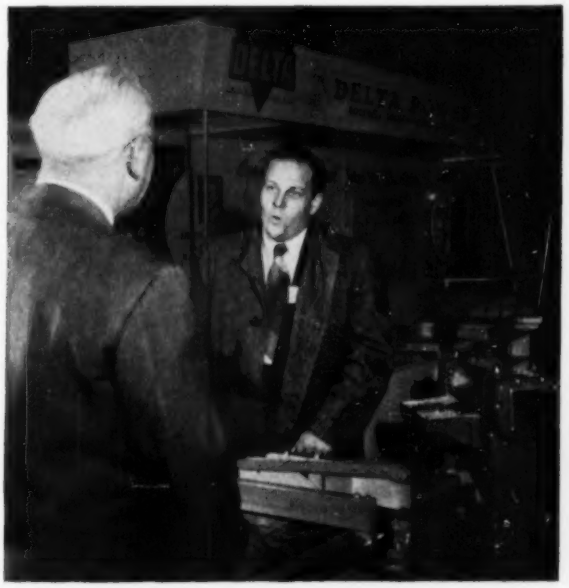
Mr. Thayer is on the staff of the Wisconsin state board of vocational education.

♦ TRACY NABERS resigned as associate professor of industrial arts, Kent State University, Kent, Ohio, to accept a position as training director with the Chrysler Corporation of Detroit, on January 1, 1953.

(Continued on page 30A)

Here's What a Teacher Says About **DELTA**

"HELLO, JOHN" Vergene E. Dunbar, right, greets John Claude, Delta school sales supervisor at the AVA convention. Mr. Dunbar is instructor in cabinetmaking at Brockton, Mass., Vocational School. Two evenings a week he teaches apprentice training. On other evenings and week-ends he works in the cabinet shop of Harry K. Schneider, Hudson, Mass., building show cases, store fixtures, kitchen cabinets, doors, windows and the like. So as you see, Mr. Dunbar knows power tools.



"BEST VALUE" "I've worked with all kinds of tools," says Mr. Dunbar, "but none compare in value with Delta. For teaching or for professional work you get your money's worth with Delta." In his school shop and at the cabinet shop he uses such Delta tools as the table saws, sanders, lathes, planers, jointers, shapers, drill presses, and so on. He reports that Delta accuracy is important for fine cabinet work, and the many safety features and guides in Delta tools speed up training of beginners.

MR. DUNBAR is a real Delta booster. "Anyone who has worked with Delta tools, and more important, any teacher who has used Delta tools in his classes, is already sold," he says. Mr. Dunbar himself has taken over 4000 hours of work in various cabinet making courses, worked in the woodworking industry from 1935 to 1948, and since that time has been an instructor. So, his opinion on power tools carries the weight of experience.

SEE FOR YOURSELF

Let your Delta dealer show you why Delta tools are the best investment for your school shop, whether your classes are in plastics, woodworking or metalworking. And if you are not on the free subscription list to receive each issue of the POWER TOOL INSTRUCTOR—issued four times a year, especially for you—send the coupon.

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☐ Send me the "Power Tool Instructor" regularly.

Name_____
Position_____
School_____
Street_____
City_____ Zone_____ State_____

PERSONAL NEWS

(Continued from page 28A)

♦ OLIVER LUEY resigned as associate professor of industrial arts, Kent State University, Kent, Ohio, to accept a position as training director with the AC Spark Plug Division of General Motors Corporation of Milwaukee, Wis., on January 1, 1953.

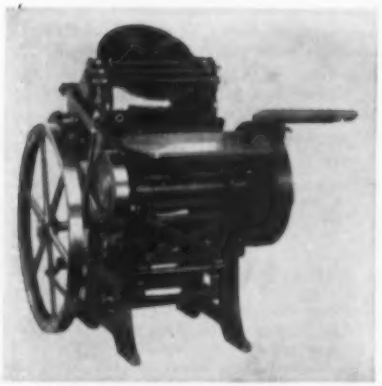
♦ JULIO QUIÑONES VÉLEZ, former district supervisor for industrial arts at Mayaguez, Puerto Rico, won an honor award in the Delta School Shop Layout Contest for his entry of a layout for vocational and technical high schools.

Mr. Quiñones Vélez is an active member of the American Vocational Association, the American Industrial Arts Association, the Puerto Rico Teacher's Association, and the Industrial Arts Teacher's Association of the Island of Puerto Rico. He is a graduate of the University of Puerto Rico and is a candidate for the M.A. degree at New York University.

♦ HOLLIS DAHLOR, director of vocational education of the Kansas City, Mo., public schools, will teach a three weeks' course in industrial education at the University of Arkansas during the summer session of 1953.

♦ DURRELL K. KNOWLES has succeeded Charles Henderson, High School East, Wichita, Kans., as day trade auto-mechanics instructor. For the past three years Mr. Knowles has taught vocational auto mechanics at William Rogers High School, Tulsa, Okla. He received his auto-mechanics experience in several garages in northern Oklahoma and holds the B.S. degree from Oklahoma University.

CHANDLER & PRICE { PRESSES and PAPER CUTTERS



C&P NEW SERIES PRESSES These presses in sizes of 8x12, 10x15, 12x18 and 14½x22, provide the student with equipment that furnishes all practical requirements of hand fed press operation. May be equipped with flywheel, belt and platen guards. Also furnished for treadle operation instead of motor drive.

The Standard for Printing Education

C & P presses and paper cutters have been standard equipment in commercial plants and schools for over 50 years. So, the selection of C & P equipment for printing classes places before the students *practical* equipment exactly as used in commercial practice in the entire printing industry.

In addition, special safety features are incorporated, when desired, in C & P presses and paper cutters so that all safety requirements are fully satisfied.

For practicality—for safety—the foresighted administrator recommends . . . Chandler & Price.

C&P PILOT PRESS A thoroughly efficient little press, chase 6½x10, that teaches basic principles of press operation with exceptionally fine printing results.

C&P BENCH CUTTER An efficient, small size cutter that handles sheets up to 19" x 24". Equipped with two-handed safety control.

"HANDBOOK OF PLATEN PRESS WORK" *is one of the outstanding aids to printing furnished without charge to printing instructors. If you do not have a copy, just request one.*

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News Notes

WORKSHOPS FOR INDUSTRIAL-ARTS TEACHERS AT SAN FRANCISCO STATE COLLEGE

A unified workshop in industrial-arts education is being offered by the college as a result of responses to an inquiry among industrial-arts teachers regarding the type of work that they desire for their professional and personal growth. These workshops are organized to provide a short-term concentration of two weeks in six different aspects of the industrial-arts program. Students may enroll for one two-week period with two semester units of graduate or advanced undergraduate credit, or may earn a maximum of six semester units by attending the regular six weeks' summer session. The enrollment for each of the two weeks' sessions is as follows: June 22 to July 3; July 6 to July 17; and July 20 to July 31.

For further information write to *Dwight W. Nichols, Director of Industrial Arts, San Francisco State College, San Francisco, Calif.*

♦ Dr. Christopher E. Barthel, Jr., assistant director at the Armour Research Foundation of Illinois Institute of Technology, will serve as resident director of the State Industrial Research Institute of Burma in Rangoon.

The principal objectives will be to train scientists, engineers, and technicians, and set up research and development programs on industrialization of agricultural products, the use of indigenous raw materials, and metallurgy.

The current work of the Burmese Institute deals with the development of paper, construction materials, and the commercial extraction of antimony from native ores.

One of Dr. Barthel's first tasks will be to work with the Burmese to establish immediate and long-range training, research, and development programs to meet the technological, industrial, and economic needs of the country.

♦ *Arc Welding* is the name of an all-new, full-color filmstrip series sure to be of particular interest to industrial, vocational, and apprenticeship training educators. Prepared by Audio-Visual Division of Popular Science Publishing Company, in co-operation with the Lincoln Electric Company, this exceptional series offers authentic, completely up-to-date coverage of a subject of first importance to America's industry.

Additional information about *Arc Welding*, full-color filmstrip series of three great titles is obtainable from your local audio-visual dealer or from the Audio-Visual Division of *Popular Science Publishing Co., 353 — 4th Ave., New York City.*

AMATEUR RADIO OPERATOR HONORED

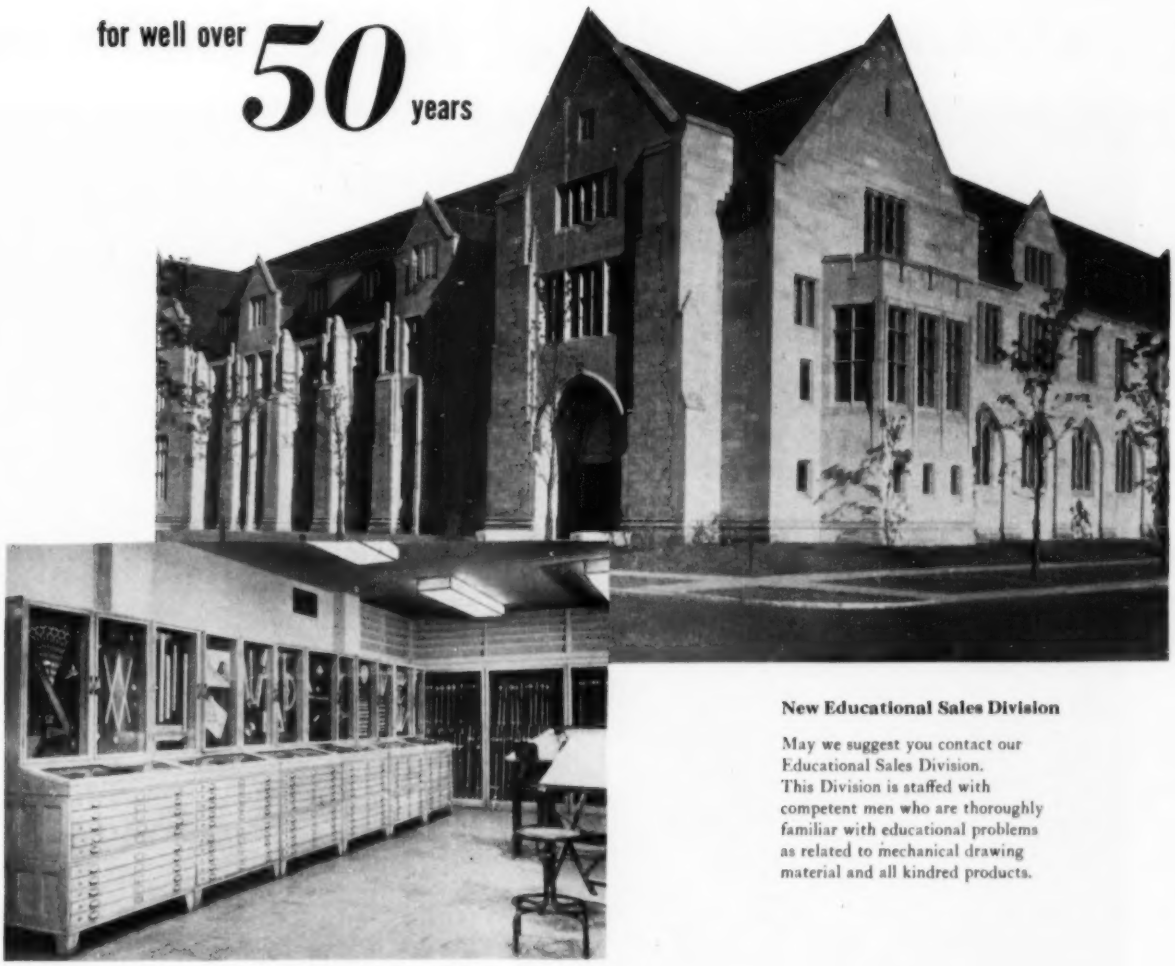
Twenty-year-old Don L. Mullican of Searcy, Ark., who served as a communications link for disaster aid in tornado-stricken Arkansas in March of 1952, received the Edison Radio Amateur Award for 1952. It was presented to him on January 28, 1953, by General Electric's Tube Department in recognition of outstanding public service when he stuck to his radio amateur rig almost without relief for more than five days to bring emergency relief to Searcy and the nearby towns of Judsonia and Bald Knob.

He received a trophy emblematic of his efforts at ceremonies conducted at the Mayflower Hotel, Washington, D. C.

(Continued on page 37A)

Part of the School and Bookstore Picture

for well over **50** years



New Educational Sales Division

May we suggest you contact our Educational Sales Division. This Division is staffed with competent men who are thoroughly familiar with educational problems as related to mechanical drawing material and all kindred products.

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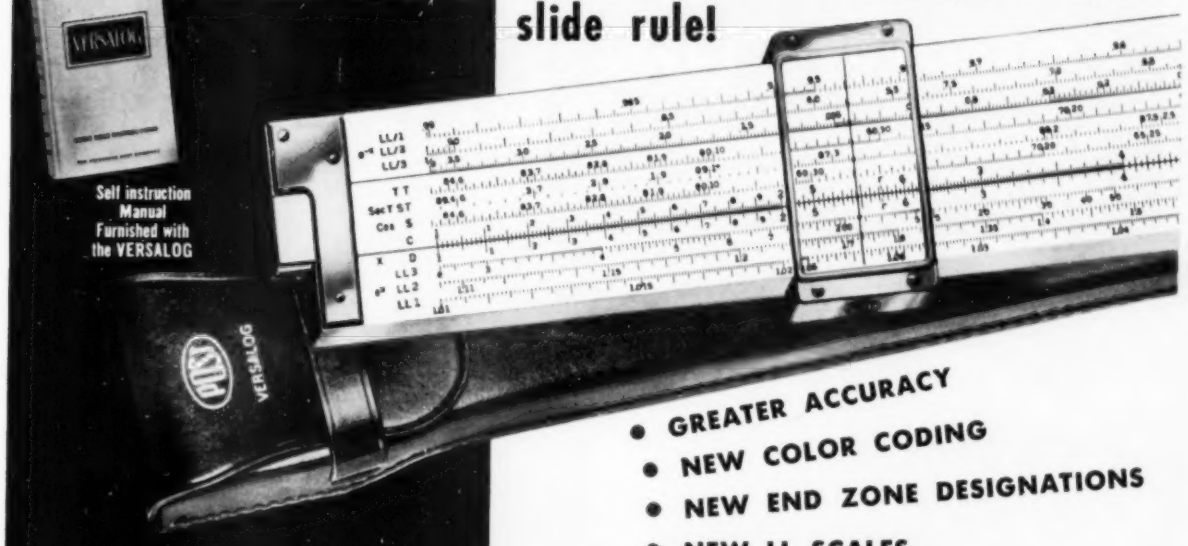
the world's finest engineering slide rule!



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- NEW COLOR CODING
- NEW END ZONE DESIGNATIONS
- NEW LL SCALES

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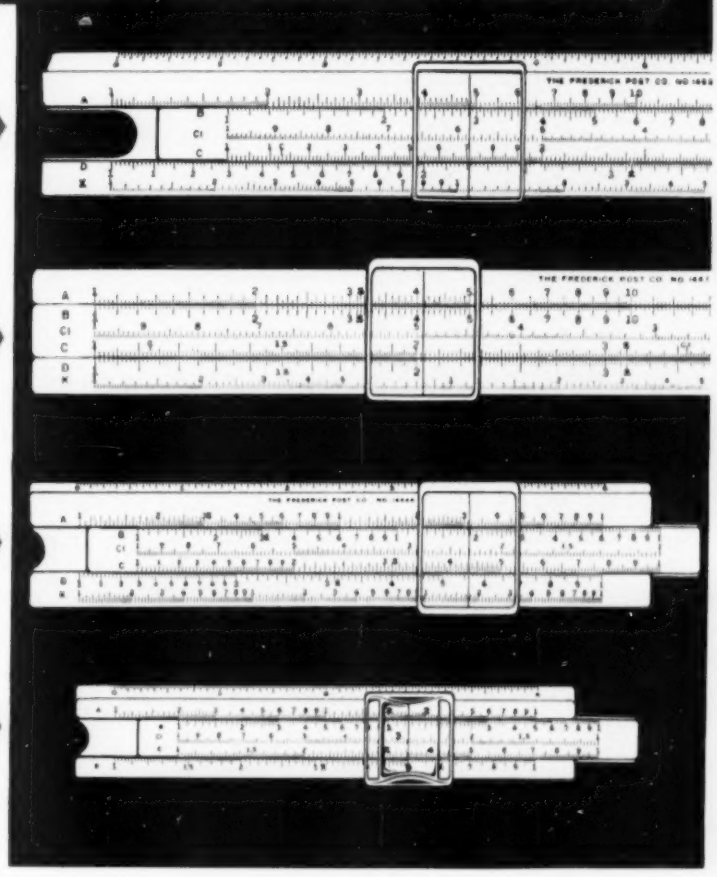
ENGINE DIVIDED ACCURATELY AND PERMANENTLY ON WHITE CELLULOID

1452W TEN INCH
Justly popular, this universal slide rule has A, B, C, CI, D and K scales on the face; with inch and metric scales on edges. Reverse side of slide has S, L, and T scales. White celluloid facing, ENGINE DIVIDED, metal-glass indicator. In slip cap case and instructions.
1452WL same as 1452W in Leather Case.

1447 STUDENT SLIDE RULE
Laminated bamboo construction, white celluloid facing, ENGINE DIVIDED with A, B, C, CI, D and K scales on face. Reverse side of slide has S, L, and T scales. Metal-glass indicator. Professional accuracy. In case.

1444K FIVE INCH
Perfect for "on-the-spot" calculations. Mannheim type with A, B, CI, C, D, K, S, L, and T scales. Metal-glass indicator, leather case and instructions.

1441 FOUR INCH
Fits in the vest pocket with the greatest of ease. Mannheim type with A, B, C, CI, D, S, L, and T scales. Metal-glass magnifying indicator, leather case and instructions.



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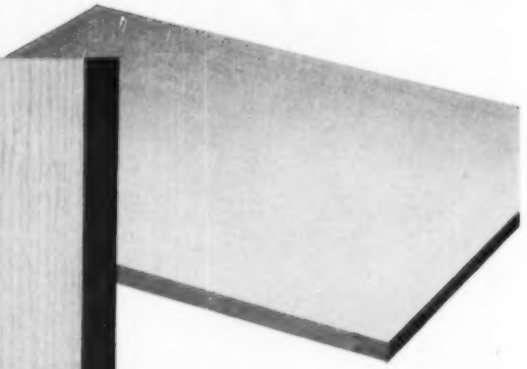

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NEWS NOTES

(Continued from page 30A)

♦ *The Story of U. S. Plywood Corporation,* a 36-page booklet, contains the story of the beginning and rise of the United States Plywood Corporation, from the time when it merely merchandized the plywood made by other manufacturers to the present where this corporation owns many mills and extensive forest reserves and does much scientific research to make plywood ever more useful to its many users.

For a copy of this book write to *U. S. Plywood Corp., New York, N. Y.*

♦ The 1953 edition of the *Blue Book of 16mm. Films* — the 28th annual revision — is ready. Once more its 172 pages list nearly 7500 educational films, more than 1000 of them again newcomers, displacing a similar amount of older material. Data on each film includes title, length, synopsis, and whether color or monochrome, sound or silent (or both), and the principal nationwide sources, with emphasis on original or primary source. Name, address, and distribution data (such as TV rights) of 400 such sources are keyed into the listings, which in turn are grouped under 182 subject-area classifications. An alphabetical index locates material on which titles are known.

The Blue Book is published by *The Educational Screen, 64 E. Lake St., Chicago 1, Ill.*

♦ The American Forest Products Industries, Inc., 1319 Eighteenth St., N.W., Washington 6, D. C., have a bibliography titled "Our Forests: Their Use and Conservation," which lists free educational aids and publications on forestry subjects.

♦ *Brass Means Business,* 16mm. sound and color, is a new film produced by Unifilms, Inc., for the Titan Metal Manufacturing Company. It runs 27 minutes.

This film presents a dynamic story of brass manufacturing and shows the varied and intricate steps involved in the making of alloys and the manufacture of myriads of brass and bronze products.

For further information write to Film Department, *Titan Metal Mfg. Co., Bellefonte, Pa.*

♦ A course in driver education for teachers is offered at Kent State University, Kent, Ohio, which meets the requirements of the state department of education and the American Automobile Association.

♦ Several staff vacancies in the industrial-arts department at Kent State University, Kent, Ohio, will be filled for not later than the fall quarter of 1953. There are 623 students enrolled in the various courses of the department during the winter quarter with a department staff of eleven full-time and seven part-time members. The department sponsors programs leading to the degrees of (1) bachelor of science in education with majors and minors in (*a*) industrial arts and (*b*) trade and industrial education; (2) bachelor of science with majors and minors in (*a*) architecture, (*b*) aviation technology, and (*c*) industrial technology; and (3) master of arts or master of education in (*a*) industrial arts and (*b*) trade and industrial education.

♦ Noncredit courses in various crafts and areas are offered as evening courses at Kent State University, Kent, Ohio. These are for the people of Northeastern Ohio who are not enrolled in a regular college program, but who wish to take courses for upgrading vocationally or for recreational purposes.

♦ Funny scenes and comic mice, or serious thoughts and sound advice — you can take your choice from the National Safety Council's new, 72-page 1953 Directory of Occupational Safety Posters containing 756 miniature illustrations of colorful visual salesmen of safety.

This directory contains advice to safety men and to teachers of industrial education on how to choose and use posters effectively, and a detailed index makes it easy to locate all posters on a particular subject.

For a free sample copy of the directory and a price schedule of posters, write the *National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.*

♦ A new full-color filmstrip series — *Woodworking* — has been produced by the Audio-Visual Division of Popular Science Publishing Company.

The series consists of six titles and 300 colorful frames. The titles are *Design in Wood, Hardwood Lumbering, Hardwood Processing, Finishing — 1, Finishing — 2,* and *Safety in the Shop.*

The filmstrips were developed in co-operation with McKnight & McKnight of Bloomington, Ill.

For further information about the filmstrip series, see your local audio-visual dealer or contact the *Audio Visual Division, Popular Science Publishing Co., 353 Fourth Ave., New York, N. Y.*

Forty-two per cent of last year's motor vehicle accidents happened in the dark.

SHELDON
CHICAGO

A better Lathe from any angle

Judge it from any angle: for accuracy, stamina, rigidity or capacity (for size). Check its component parts—its spindle, spindle bearings, lead screw, apron, carriage, bed, gearing, or the power delivered by its drive—you will find the SHELDON Lathe a quality tool both in appearance and "under the hood".

Write for Catalog

SHELDON MACHINE CO., Inc., 4244 North Knox Ave., Chicago 41, Ill.

New Publications

Industrial Arts Laboratory — Chicago Public High Schools

Paper, spiral binding, 142 pp., 8½ by 11 in., illus.

A new industrial-arts laboratory course of study prepared by the divisions of industrial arts and curriculum development. The committee which evaluated and modernized the course was composed of leaders from industry, labor, parent-teacher organizations, teachers, students, supervisors, directors, principals, and district superintendents.

The course is based on the nine major functions of living developed by the Chicago Curriculum Council.

It is divided into seven units which embrace electricity, metal, woodworking, plastics, graphic arts, ceramics, and leather.

Living Your English

By Robert G. Colton, Grace M. Davis, and Evelyn A. Hanshaw.

Book 1, paper, 200 pp., 8¼ by 10⅝ in., illus., $1.

Book 2, paper, 200 pp., 8¼ by 10⅝ in., illus., $1. D. C. Heath and Co., Boston, Mass.

For slow learners who have troubles in mastering English these textbook-workbooks will be found very helpful.

They contain many exercises all of which will help the slow learners improve in the subject which is so important to them no matter what occupation they embrace later on.

Woodworking for Everybody

By John G. Shea and Paul N. Wenger. Cloth, 187 pp., 8½ by 11¼ in., illus., $3. International Textbook Co., Scranton, Pa.

This is the tenth printing of this book which will be found useful in the school shop as well as in the home workshop.

It contains chapters on the story of wood, shop equipment, processes, joinery, woodworking machinery, tool sharpening, wood finishing, safety, and a number of useful and pleasing projects for the home.

Complete Operation and Maintenance Manual on Rochester Carburetors

100 pp., 8½ by 10½ in., illus., $1.50. Rochester Products Division, General Motors Corp., Rochester 3, N. Y.

This is a profusely illustrated and comprehensive book containing basic data for the operation and maintenance of all latest model Rochester Carburetors. It was written and produced for use as a textbook in school shops, training aid classes, and trade schools, as well as for the professional mechanic.

Although applying only to the servicing and operation of Rochester Carburetors the book is a valuable reference aid for beginners, since the first chapter is devoted to the basic principles of carburetion.

Many of the manual's pages are printed in two colors, as are most of the 325 illustrations. The second color not only adds to appearance but also clearly indicates fuel flow during all phases of carburetor operation.

After the first chapter on basic principles of carburetion, each succeeding chapter is devoted to a particular model Rochester Carburetor. Operation on the carburetor systems, disassembly and assembly procedures, cleaning and inspection of parts, and adjustment methods are discussed in detail.

Engineering Manufacturing Methods

By Gilbert S. Schaller. Cloth, 613 pp., 6½ by 9¼ in., illus., $7. McGraw-Hill Book Co., Inc., New York City.

This book is an excellent text for the engineering and technical student to obtain background material for his future life in industry.

The contents present a comprehensive picture of the materials used in engineering manufacturing, and then portray the processes through which these materials have to go before they can take their place as finished projects of commerce and for industry.

The book also contains an extensive list of visual aids which may be used to supplement the material presented in the book.

TV Manufacturers' Receiver Trouble Cures

Volume 1, paper, 115 pp., 5¼ by 8¼ in., illus., $1.80.

Volume 2, paper, 117 pp., 5¼ by 8¼ in., illus., $1.80.

Edited by Milton S. Snitzer. John F. Rider Publisher, Inc., New York, N. Y.

These books give exact directions for correcting TV receiver performance troubles. Each remedy is developed by the receiver's own manufacturer.

Volume 1 covers the following brands: Admiral, Air King, Andrea, Arvin, Belmont-Raytheon,

(Continued on page 40A)

The Standards By Which All Others Are Judged

Starrett TOOLS

For more than seventy years the name STARRETT has symbolized fine craftsmanship, highest quality and dependable accuracy. The complete Starrett line includes many tools and kits of tools especially suited for school shop use and priced to fit shop budgets. See them at your industrial distributor's.

THE STARRETT BOOK FOR STUDENT MACHINISTS

Provides essential information about tools, machines and modern shop methods. 200 illustrations, 30 reference tables. Only one dollar per copy.

1" MICROMETER NO. 436

COMBINATION SQUARE NO. 11

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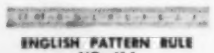

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SINCE 1880 WORLD'S GREATEST TOOLMAKERS

THE L. S. STARRETT COMPANY Athol, Massachusetts, U. S. A.

Buy THROUGH YOUR INDUSTRIAL DISTRIBUTOR

• Prompt delivery • Dependable service • Quality products

WHITE WAS RED!

LOCKER TYPE SCHOOL SHOP BENCH

32¼" high with 4 Stations. Double faced heavy gauge steel metal base with 6 lockers on each face. 2¼" top. 4 5CD vises mounted on corners.

Red in the face, and wilting around the collar. He needed some Locker Type 4-Station School Shop Benches – couldn't remember who made them. Then he remembered his B-G Master Catalog and found just what he wanted. If you're wondering who makes what – save your blood pressure. If it's good, B-G catalogs it and you'll have it quick.

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NEW PUBLICATIONS

(Continued from page 38A)

Bendix, Calbest, Capehart-Farnsworth, CBS-Columbia, Certified, Crosley, and Dumont.

Volume 2 treats the troubles that arise in the following brands: Emerson, Fada, Firestone, Freed, Gamble-Skogmo, General Electric, Hallicrafters, Hoffman, Industrial, International, and Jackson.

Mechanics of Materials

By Seibert Fairman and Chester S. Cutshall. Cloth, 420 pp., 6 by 9¼ in., illus., $5.75. New York: John Wiley & Sons, Inc.; London, Chapman & Hall, Ltd.

This is a very theoretical text for engineering students, and for that reason presents not only a large amount of textual matter on the subject but also hundreds of problems for the student to solve.

These problems are accompanied by completely solved examples so that the learner sees how the principles are to be applied.

How to Make Modern Archery Tackle

By Tracy L. Stalker. Paper, 34 pp., 6 by 9 in., illus., $1. Casein Company of America, 350 Madison Ave., New York 17, N. Y.

A book of brief directions, fully illustrated, showing how to make bows, bowstrings, and arrows.

The book also shows how to make gluing forms for backing, facing and laminating, and jigs for making bowstrings, and for fletching.

UHF Practices and Principles

Cloth, 390 pp., and 285 illustrations, $6.60. John F. Rider, Publisher, Inc., New York, N. Y.

This book provides a fundamental background for understanding UHF transmitting and receiving equipment as it applies to the various services (police and fire departments, amateur radio, taxicab and truck services, radio navigation, etc.) using it. However, much emphasis is given to its practical applications to television. Presently available converters are discussed by brand name, with circuit descriptions and schematics included. UHF oscillators are treated with examples of practical circuits used in equipment.

Other phases of the subject discussed are: UHF receiving antennas, electromagnetic radio waves, transmission lines and wave guides, etc. A section of questions is included at the end of each chapter as a means of reviewing the principal high lights. Also an extensive bibliography is given to help the reader locate additional information on the subject.

The Research Paper — Gathering Library Material; Organizing and Preparing the Manuscript

By Lucyle Hook and Mary Virginia Gaver. Paper, 85 pp., 7⅜ by 10⅝ in., $1.30. Prentice-Hall, Inc., Publishers, New York City.

This is the second edition of this book which outlines for the writer how to make use of the library and its indexes, bibliographies, etc., and how to get started on and proceed with a manuscript on a given subject.

Free and Inexpensive Learning Materials

Paper, 194 pp., 5½ by 8½ in., $1. Division of Surveys and Field Services, George Peabody College for Teachers, Nashville 5, Tenn.

Classified under 270 headings this book contains 2521 entries.

Each title is annotated and few of the items mentioned cost over 50 cents.

Sixty Power Tools and How to Build Them

Cloth, 144 pp., 6⅝ by 9½ in., illus., $2.50. Popular Mechanics Co., Chicago, Ill.

This book will be of great interest to teachers of school shops in the poorer districts, homecrafters, and farmers in their farm shops who cannot afford power tools. The model maker also will get a lot of good pointers out of it.

The title indicates the wealth of useful material which this interesting book contains.

ELIMINATE
HAZARDOUS
LINESHAFTING

Specifically designed to individually motorize machine tools originally driven by lineshaft, LIMA GEARSHIFT DRIVES were selected by Ohio State University to provide its students with the very best in modern machine shop equipment.

Ohio State is but one of many schools throughout the nation that have modernized their machine shops with LIMA DRIVES, providing the utmost in functional safety, adequate lighting, proper machine location and the complete elimination of hazardous lineshafting.

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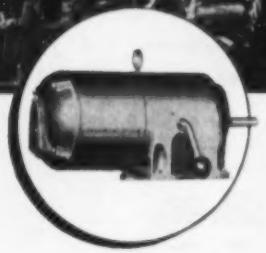

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DISCIPLINE

(Continued from page 176)

7. Do the students like the teacher?

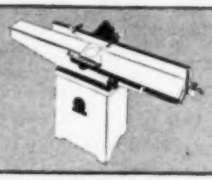
8. Be sure the student has aptitude for what is being taught.

9. Is the student socially adjusted to the group?

10. The instructor must be interested in teaching and like children.

11. The student must be interested in

(Continued on page 42A)



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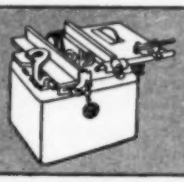
Over 50 Models—Durable. Sensitive. Larger, longer quills for heavier thrust loads and accurate deep hole drilling and tapping. Involute six-tooth spline drive for freedom from vibration. Balanced for high speeds for reduced drill breakage.

24" x 5" HEAVY DUTY JIG SAW

Cuts plumb when sawing curves. 20" x 20" table. Wider range tension control. Cuts materials up to 5" thick. Handles blades 5" to 9" long. 50% longer blade stroke cuts faster.

SAW-JOINTER WITH TILTING ARBOR SAW

Blade, not table, tilts. Unique drive permits mounting motor rigidly and separately. Cuts, miters, planes, rabbets, grooves. Longer table and fence. Perfect work on longer stock.



10" TILTING ARBOR SAW

Can be driven by standard motors, even gas engine or line shaft, by using "rolling drive pulley." Motor is entirely separate and away from dust, keeping vibration from the arbor.

HEAVY DUTY 12" x 4" THICKNESS PLANER

50% faster. Powered for output of 14 feet per minute. Planes materials as short as 6½"; hard woods down to 1/16" thick. Built to last on hard jobs.

14-INCH HIGH SPEED BAND SAW

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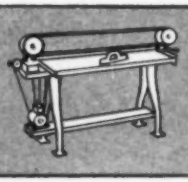

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Lowest cost, most compact mill type, hand stroke. Serves as drum sander on contours and irregular shapes. Work is always face up, eliminating guesswork and saving time.

SPINDLE SHAPER

The only shaper having ½" and ¼" cutting arbors formed on a solid one-piece spindle. Stronger. Truer running. Safer. Runs wide mouldings and raised panels in one cut.

SPINDLE SANDER

Sands wood and grinds plastics and metals up to 6" thick, straight and exterior and interior contours to as sharp a radius as ½" and all bevels 0 to 45°.

FRICTION-MATIC WET TOOL GRINDER

Self-adjusting friction roll drive. Peripheral speed remains constant as wheel wears. No water thrown on operator. Larger adjustable tool rest, mounted above grindstone for comfortable operating position and control of pressure.

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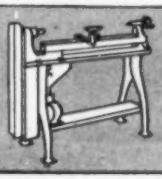

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☐ Please send free instruction book on metal spinning.

NAME.....

SCHOOL.....

STREET.....

CITY & STATE.....

DISCIPLINE

(Continued from page 40A)

the subject that is being taught, know and like the subject matter, and have aptitudes.

12. The instructor must be able to speak well (language).

13. He must be able to control his emotions.

14. He must have a sense of fairness.

15. He must know and appreciate learning difficulties.

16. He must be loyal to the school administration.

17. Working conditions may effect discipline.

18. There must be natural travel space in the shop.

19. The lighting system should be adequate.

20. Dull tools and equipment in the shop may start trouble.

21. Proper ventilation must be provided in the shop.

22. The shop must be clean and have a real shop atmosphere.

23. Have lockers and storage space.

Maintaining discipline is a co-operative job between two persons or any group of persons. In establishing discipline there are three main objectives which should be carefully considered.

1. Establishing and maintaining conditions favorable to work, study, and play — conditions free from distractions, disturbances, and misbehavior.

2. Establishing and maintaining respect for authority within the school, community, and state.

3. Developing, on the part of pupils, ideals, attitudes, interests, habits, and skills making for self-direction, a feeling of belonging and worth-whileness, and good citizenship.

The high school youth who, through a well-planned program of training in the elementary and high school grades, has become a good school citizen — one who is responsible and trustworthy, conscientious, courageous, co-operative, courteous, helpful and useful, self-sacrificing enthusiastic with regard to the welfare of the school, and loyal to its ideals and traditions — has gone far toward becoming a worthy member of a democratic society.

Discipline in both home and school should recognize the dignity of each individual and his right to seek recognition and direct his own activities.

Importance of Discipline

Stated negatively the lack of discipline in a school or class results in:

1. Encouragement of misbehavior and rowdyism, disregard of the rights of others, antagonism to authority and the law, development of antisocial behavior, and undesirable citizenship.

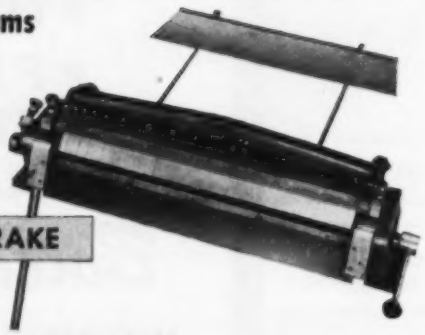
2. Ineffective instruction, loss of time, and poor work on the part of both teachers and pupils.

3. Criticism of the teachers, principal, superintendent, pupils, and eventually the school — culminates in the loss of jobs and decline of interest and support of the school by the people of the community. The people of a community are likely to be aware of poor order and lack of discipline and to be more concerned about the *discipline* of the school than anything else. The ability to maintain good discipline has long been considered one of the

(Continued on page 45A)

BERKROY 24" SHEET METAL TOOLS

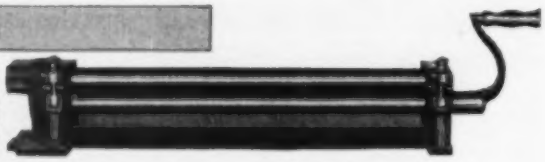
Enlarged Training Programs Possible With These Production Tools of Advanced Design



24" BOX AND PAN BRAKE

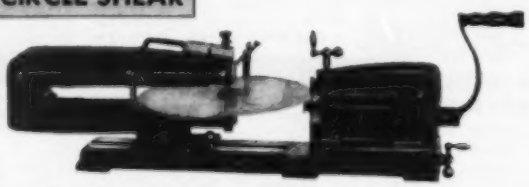
Turning a knob provides infinite adjustment to any angle from 0° to 135°. Forms any size box or pan from ½" to 24" by ¼" graduations. Makes intricate folds, reverse bends and radius bends on sheet steel up to 16 gauge and up to 24" wide. Bending leaf operates on Torrington Needle Bearings. Full 1" clearance between top fingers and anvil. Maximum 2½" box or pan depth permits deeper bends.

24" SLIP ROLL



Finger-tip controls on both ends of top roll permit quick adjustment for any material thickness within capacity of unit. Will accurately roll 24" widths in 20 gauge mild steel—heavier gauges in narrower widths. Removal of work is easily accomplished due to the spring loaded, hinged, top roll. Heavy duty rolls 1½" diameter—distortion proof channel iron base, enclosed gears and oilite bearings are a few of many features.

24" RING AND CIRCLE SHEAR



Equipped with MICRO-FEED control of circle diameters—an exclusive feature. Cuts rings and circles up to 24" diameter. Handles a wide variety of trimming operations, strip cutting and contour cutting on sheet metal up to 20 gauge. Cutters are hardened, tempered tool steel. 32" x 7" bed length, 12" x 4½" shear, and 21" x 3¾" clamping head. Accurately machined, enclosed gears and rugged construction throughout.

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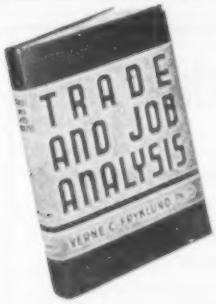

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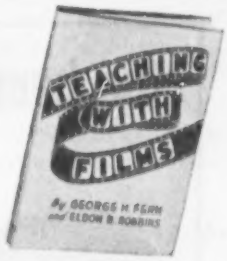

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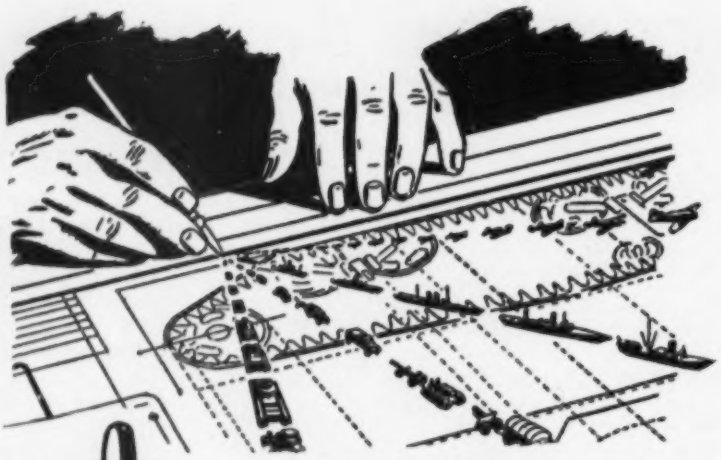

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DISCIPLINE

(Continued from page 42A)

chief measures of teaching competence and also of the success of the school administrator in managing the school.

Underlying Causes of Unsatisfactory Behavior

1. *Physical Health and Development* — Many problems of discipline in the school can be traced to students who are ill, have poor physical condition and/or development, possess defects in speech and hearing, poor vision, unsound and defective teeth, skin disorders, and overactivity of certain endocrine glands.

2. *Intelligence* — Urged on by schoolmates or by members of *the gang* the pupil with low intelligence is likely to commit an offense without realizing the consequences. The pupil with a high I.Q. may have to be kept busy and interested.

3. *Home Environment* — The social and economic status of the family — unfavorable living conditions — lack of harmony in the home — improper diet — favoritism shown by parent to a brother or sister — lack of understanding on the part of parents in attempting to improve the conduct of their children.

4. *The Church and Religious Training* — The influence of the Church on young people has tended to improve conduct and to establish higher standards of ethical character. The pupil who has had no religious training and who has not come under the influence of the Church is likely to have low standards with respect to conduct in school.

5. *Community Environment* — Particularly significant in their impact upon the thinking and behavior of youth are the ethical values and standards of conduct held by the people of the community. If the possession of wealth is the all-important criterion of success in a community the child whose parents are poor and who do not live in the so-called fashionable section of town, may develop an inferiority complex. The community which has low standards of morality and conduct encourages poor conduct and lawlessness on the part of its youth. Communities differ widely with respect to their accepted standards of value and ethical character.

6. *School Environment* — In addition to the various factors already mentioned as influencing behavior, the pupil is under the environment provided by the school during a considerable part of each day. A favorable school environment tends to offset the effect of other factors and environments that encourage unsatisfactory behavior. A school has done a superlative job when it sends forth graduates who not only think independently but rejoice in vigorous thinking, and who enjoy rather than endure human relationships. The instructor must prepare students who strive for the common welfare not merely from a barren sense of duty but from that genuine love of their fellow men that has its roots in their own satisfactory experiences in a school that has given them generously of approval, taught them self-discipline, and set them an example of the spirit of mutual sharing in work and pleasure.

Recognition of Felt Needs as Factors Affecting Pupil Behavior

Basic to an understanding of pupil behavior is a recognition of the fact that an individual, particularly during adoles-

(Continued on next page)

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Designed for small sheet sizes. Ideal for instruction in printing greeting cards, decals, labels, catalog and menu covers, daylight fluorescent applications, printed electrical circuits, etc.

- Speeds up to 3000 per hour
- Hair line register adjustable while press is running
- Handles paper up to 40 pt. board, plus plastic, light metal, etc.
- 15-minute make-ready
- Line contact printing assures utmost sharpness
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DISCIPLINE

(Continued from previous page)

cent years, normally has certain strong drives, and that blocking such drives or felt needs tends to result in emotional upsets. Among the major drives that should be taken into consideration in disciplining pupils at the elementary grade and high school level are the following:

1. *The desire to be successful* — Opportunity for achieving success should be provided — an occasional failure may be disturbing to a pupil — but repeated or continued failures are likely to result in tragedy for the individual and for society.

2. *The desire for recognition and approval* — The pupil who is given no recognition or approval is quite likely to get into trouble by trying to attract attention.

3. *The longing for security* — In the home, in school, in pupil activities, in financial matters, in friendships, and in acceptance by family and friends is desired by everyone.

4. *The desire to belong* — to clubs, gangs, home, athletic teams, and school. The pupil who is avoided by other pupils, and *picked on* by other children and sometimes by adults, possibly because of some physical defect or peculiarity in dress and appearance or manners, is quite likely to become a disciplinary problem.

5. *The desire for new experiences and change* — The pupil's urge to travel or explore, to find new friends, to have a job and money of his own, and to get away from monotony, may be causes of irritation, truancy, and getting into trouble at home and in the school.

An effective guidance program in the school can do much to analyze a pupil's difficulties and to help him in making satisfactory adjustments.

Suggestions for Developing and Maintaining Good Discipline

Ways of Preventing Disciplinary Problems from Arising:

1. Strive to develop an educational program that is interesting to pupils. When pupils are interested in what they are doing they are not likely to create trouble.

2. See that teachers are well prepared for each day's work. The unprepared teacher creates a situation that invites disorder.

3. Develop an effective guidance pro-

(Continued on page 48A)

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MORGAN VISES

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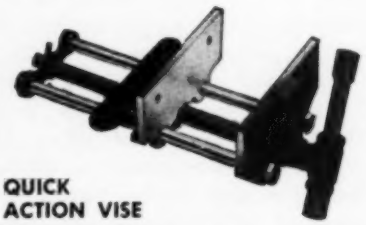

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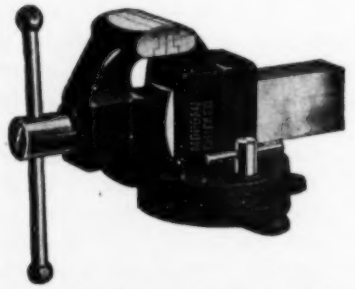

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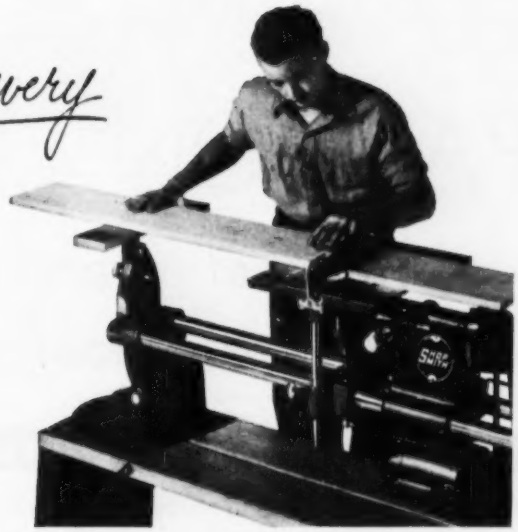
a Made-to-order shop for every woodworking class!

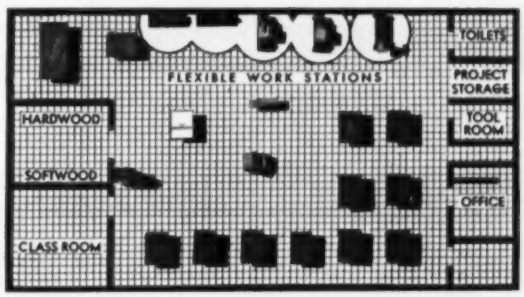


That's what you have with the Flexible Shop, a school shop equipped with one or more SHOPSMITHS. Because every SHOPSMITH is a multi-purpose tool, convertible to an 8" circular saw, a 12" disc sander, a 33" woodworking lathe, a 15" drill press or a horizontal drill in less than 60 seconds.

This means you can set up your SHOPSMITHS to fit the exact needs of every class. Beginners, for example, can all learn drill press operation; in a class of beginners and advanced students, everyone can use the tool he is ready for. In this way you keep students and machines busy at all times, and work flows quickly and smoothly through your shop.

But flexibility is only one SHOPSMITH advantage. Another is quality, the best proof of which is that SHOPSMITH either matches or outperforms most individual tools on the market. As for saving space—SHOPSMITH stores in a 16" x 60" area, and works in a 6' x 8' space. Fill out and mail the coupon today for complete details.

SHOPSMITH®



Typical Flexible Shop Layout shows five SHOPSMITH work stations. Flexibility is equivalent to shop equipped with 25 single-purpose tools. Arrangement provides maximum efficiency at minimum cost and in minimum space.

QUICK FACTS ABOUT SHOPSMITH

8" CIRCULAR SAW 2¼" depth of cut. 17" x 54" effective table area.

12" DISC SANDER 14½" x 17" tilting table. Disc can be fed into work.

33" WOOD LATHE 15" swing over ways. Speeds: 875-3450 rpm.

HORIZONTAL DRILL Unlimited capacity, 4" quill feed.

15" DRILL PRESS Chuck to table, 27" max.; to floor, 55" max.

ONLY $199.50 With special ½-h.p. motor and special school guards, $242.45

MAGNA ENGINEERING CORPORATION
Dept. 288-U, at factory nearest you:
12819 Colt Road, Cleveland 8, Ohio, OR
Menlo Park, California

Please send me complete information about the *Flexible Shop* and the application of SHOPSMITH to industrial arts education.

Name _____ *Position* _____

School _____

Address _____

City _____ *State* _____

DISCIPLINE

(Continued from page 46A)

gram at the various grade and school levels.

4. Develop an effective health program that includes health instruction, physical development, physical and health examinations, followed by corrective work, and encourage interest and participation in such a program on the part of both pupils and parents.

5. See that the conditions under which pupils work are conducive to good work. Uncomfortable seats, poor lighting, improper heating and ventilating, distractions, and inefficiency in classroom management or monotony in classroom procedure tend to cause disordered and unsatisfactory behavior.

6. See that pupils have ample opportunities to participate in planning, organizing, and directing programs and activities in which they are interested. Pupils also should be given responsibilities and opportunities for participation in the administration and management of the school in those phases of such work which are within the levels of comprehension and maturity of the particular individual assigned to work of this kind. The pupil who is made to feel that his participation is needed and that he is trusted with a responsibility is not likely to become a disciplinary case.

7. Plan the daily schedule so that pupils have opportunity for relaxation between class periods and time enough to go from one class to the next one assigned without being late.

8. Impress upon teachers the importance of seeing that pupils understand and recognize the practical applications of study and work in the particular course.

9. Develop a minimum number of rules and regulations for pupil conduct. When pupils have had a part in formulating rules and regulations there is apt to be better understanding, co-operation, acceptance of regulations, and conduct on the part of pupils. Posting of printed regulations and *DON'T* signs in corridors and classrooms tends to invite disobedience.

10. Impress upon teachers and other staff members responsible for disciplining pupils, the importance of knowing the exact pupil who is actually concerned before taking any major disciplinary action. Teachers should be informed with respect to suitable and acceptable kinds of punishment. They also should be informed about policies and regulations on the board of education that pertain to discipline and punishment.

11. See that teachers recognize the importance of taking an interest in each pupil and that they continuously make an effort to know each individual's educational needs, interests outside of class, and hobbies.

12. Make a continuous effort to develop on the part of pupils, courtesy, consideration for the rights and feelings of others, honesty, sportsmanship, and good school citizenship.

13. Keep an eye on the attendance record of individual pupils, investigate the cause of each absence, and confer with parents when in doubt as to the pupil's explanation regarding frequent or continued absence.

14. Co-operate with local community leaders in seeing that the community has

(Continued on page 51A)

PAXTON LUMBER

to meet every need in your school shop!

A COMPLETE SELECTION

You will find that PAXTON has a complete line of quality hardwood and softwood lumber and plywood, as well as other material, to perfectly fulfill the requirements of each individual project.

GREATER ECONOMY

Since PAXTON products are of a constant high quality, waste and spoilage are reduced to a minimum.

MORE SATISFACTION

Naturally your students will derive more satisfaction from their efforts to create attractive articles in wood, working with quality lumber — PAXTON LUMBER. You and they will see the difference!

Write to the yard nearest you for a free catalog!

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Specialists in Industrial Arts Lumber and Plywood

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For precision student work make WEBER – COSMOS DRAWING INSTRUMENTS (Original Round System) the heart of your equipment. Use WEBER – COSMOS INSTRUMENTS with the other Weber drawing necessities, including T Squares, Triangles, Curves, Scales, Slide Rules, Drawing Boards, and Waterproof Drawing Inks for top performance at school budget prices.

Weber – Cosmos Drawing Instruments are available in sets, and separate pieces; also a full line of replacement parts. Superb in workmanship and materials.

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Texts in Mechanical Drawing
designed
to meet your needs in
Approach, Content, and Grade Level

DRAWING FOR LIFE AND INDUSTRY
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Emphasizes the kind of mechanical drawing men and women in *all* walks of life find useful. $1.56

MECHANICAL DRAWING
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Designed for two years of work in the secondary school. Covers the latest requirements of industry, excellently organized and presented.
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BASIC MECHANICAL DRAWING
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For 7th and 8th grade level. Excellent content and organization. 96 cents

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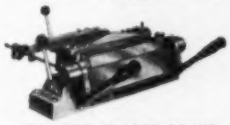
Projects in Metalworking

Written by
DONALD G. LUX
Instructor, Division of Industrial Education
*State University

NEW 32 PAGE BOOK contains 12 projects to aid the Metalworking Instructor!

DI-ACRO BENDER NO. 1



DI-ACRO FINGER BRAKE

DI-ACRO ROLLER

This booklet is designed to illustrate projects which include in their construction common metalworking operations that are readily performed on the Di-Acro Machines best adapted for use in the school shop—Rollers, Brakes and Benders.

These Di-Acro Machines are versatile, are made in sizes which are suitable for the small school shop, and are of sound construction which should appeal to school shop instructors and supervisors. Complete information on Di-Acro Rollers, Brakes and Benders is contained in the booklet.

*Name on request.

TO THE INSTRUCTOR OR SUPERVISOR
A copy of the PROJECTS IN METALWORKING booklet is available to you free of charge. Request it on your school letterhead. Copies in classroom lots—25¢ each.

DI-ACRO is pronounced Die-ack-ro

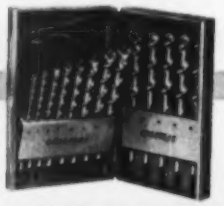
It is the registered brand name for the more than 40 hand and power operated Di-Acro Benders, Brakes, Notchers, Punch Presses, Rod Parters, Rollers and Shears made in U.S.A. by

O'NEIL-IRWIN MFG. CO.
351 Eighth Avenue
Lake City, Minnesota

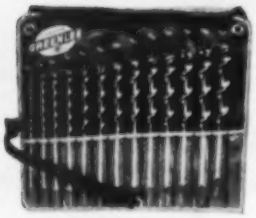
di-acro PRECISION METALWORKING MACHINES

for fast, clean boring

GREENLEE 22 SOLID-CENTER AUGER BITS make good workmanship come easy. Smooth, *accurate* holes are bored swiftly because solid-center design gives extra strength and provides positive, fast chip clearance. Correctly formed screw point and cutting edges last through long use. "Induction Heat-Treated" for uniformity, long life . . . "Plastic-Sealed" to reach you factory-sharp. Buy singly or in sets, as shown below.



Set of 13 bits in steel box. Hang up or stand on shop bench.



Sets of 6, 8, 9 or 13 bits in plastic roll. Grommets for hanging up.

Set of 13 bits with convenient metal holding panel. Easel for standing up. Holes at top for hanging.

TOOLS FOR CRAFTSMEN
GREENLEE

FREE FOLDER gives details on GREENLEE 22 Solid-Center Auger Bits and other fine hand tools in the GREENLEE line. Write Greenlee Tool Co., 2025 Twelfth St., Rockford, Ill.

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MECHANICAL LEAD HOLDER AND LEAD POINTER!

INSURES A PERFECTLY POINTED PENCIL—ALWAYS

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DISCIPLINE

(Continued from page 48A)

adequate provisions for recreation and a well-planned and directed program that will attract and interest young people during their leisure time.

15. Co-operate with local leaders in seeing that juvenile court officers who understand and recognize the needs and special problems of youth are appointed.

When Disciplinary Problems Actually Arise

1. Confer with parents immediately in serious cases of unsatisfactory behavior on the part of pupils — cases involving the moral reputation of a pupil — frequent or continued unexplained absences — indication of criminal tendency — juvenile delinquency — lack of interest or progress in school — cases involving suspension or expulsion from school.

2. Avoid punishing the entire group for the misdemeanor of an individual pupil.

3. Don't attempt to get order in a class or study hall by rapping on the desk, *bellowing* at individual pupils, or continually *shushing*.

4. Don't punish on the spur of the moment while both the teacher and the pupil are under an emotional strain. Time in which to *think things over*, particularly in the case of older pupils, may be time well spent.

5. Avoid a display of temper or taking an offense as a personal insult.

6. Don't take too seriously slight irregularities of conduct.

7. Avoid continuously making threats.

8. Don't send a pupil out of the classroom into the corridor as a punishment.

9. Avoid punishing a pupil in the presence of other pupils. Ridicule, use of sarcasm, and methods and forms of punishment that do not enable the individual to retain his self-respect should not be used. Don't treat older pupils as *mere children*.

10. Avoid assigning major responsibilities for handling disciplinary cases to a staff member whose major duty is pupil guidance. The guidance counselor occupies a position in relation to the pupil similar to that of a lawyer who is the counsel for the defendant in a court case.

11. Impress upon teachers the importance of retaining a good sense of humor and good poise in their relationships with pupils and parents when disciplinary problems arise.

12. Don't assign study or class work or lower the pupil's grade in a course as a punishment.

13. Avoid continually sending pupils to the principal's office for minor offenses. The principal should be consulted in serious cases. If a principal is forced by teachers to handle minor disciplinary problems he gradually loses the power and ability to cope with serious cases of discipline.

14. Don't use corporal punishment. In most communities board of education policy and regulations do not permit the use of corporal punishment. Where corporal punishment is allowed and in cases where such use of force seems to be the only effective method of punishment, the teacher or principal inflicting such punishment should always have a reliable witness present. It is best of course never to resort to this form of punishment.

15. Investigate underlying causes and secure all relevant facts before inflicting punishment.

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FOR YOUR STUDENTS

DEK-TUFTS

4 INCH SQUARE LEATHER-LIKE TUFTS

Imaginative Dek-tufts can be used in countless ways to add a colorful leather like finish to picture frames, toy chests, cigarette boxes, lamps, book cases, tables. A project may be completed with as little as two Deks or as many as your student's imagination requires.

Simple to attach to any wooden surface. Just tack Dek-tufts on and they last for years . . . they are constructed of rugged, lumarith acetate — can be washed . . . are non-inflammable.

Professional looking Dek-tufts make your student's projects completely finished pieces of work. If the 4" squares do not fit exactly they can easily be cut to size . . . And there are eight vibrant colors to choose from: forest green, lime, grey, red, ivory, beige, tuscan wine, and black.

Economical We offer a special wholesale price of 6c per square to schools. Dek-tufts retail for 10c per square throughout the country. A box of 50 threaded matching nails costs only 25c. As economical as Dek-tufts are, they produce a finished product which any parent would be proud to display at home.

Free samples and literature are available to you. Write today.

DEKS, inc. 482 Broome St., New York 13, N.Y.

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PRECISION BUILT
WOODWORKING BENCHES

The basic Tolco line features 26 quality built shop benches and art tables. There is a model to fit every need and budget. The popular TM-12 four student woodworking bench shown has 2¼" hard maple, edge grained, electronically glued top. Base is constructed of heavy metal, has 12 lockers. Tolco products are built right today for thousands of abusive tomorrows. Why be satisfied with anything less than the finest? Write today for full color illustrated folder of the complete Tolco line.

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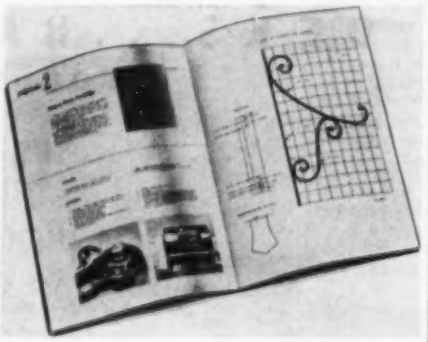
Established 1894 — Our 59th Year

SHOP EQUIPMENT NEWS

METALWORKING PROJECT BOOK

Shop instructors and supervisors may obtain a free copy of a 32-page booklet on "Projects in Metalworking" which has just been published by O'Neil-Irwin Manufacturing Company.

The booklet, written by Donald G. Lux, an instructor in industrial education at a leading midwestern university, contains 12 projects which may be used as is or can be adapted to individual classroom requirements.



Double-page spread from "Projects in Metalworking"

Typical projects are an outdoor lamp, jewelry box, name plate, hanger, pin-up lamp, and wastebasket.

Materials, procedures, and working drawings on each of the projects are described completely. Photographs show the finished projects and also describe operations that are performed with Di-Acro benders, brakes, and rollers.

Copies of the booklet in classroom lots are available at a special price of 25 cents each.

When writing to *O'Neil-Irwin Mfg. Co., 544 Eighth Ave., Lake City, Minn.*, do so on school stationery.

For brief reference use IAVE — 0501.

THREE NEW DELTA POWER TOOL CATALOGS

The Delta Power Tool Division of the Rockwell Manufacturing Company have just issued three new catalogs.

A. The new Deltashop, a combination tool powered by one motor, and the whole mounted on a stanch steel stand.

It occupies only a 3-foot square floor space although it provides its owner with an 8-in. tilting arbor saw, a 4-in. jointer, an 11-in. drill press, and a disk sander.

B. The March-April 1953 Delta Power Tool Instructor describing work that may be done with a drill press — mortising, shaping, routing, etc. It also pictures how industry makes use of the same tools that can be used in the school.

C. A catalog of industrial machine tools — band saws, circular saws, combination unit, cut-off machine, deburring machine, disk abrasive and finishing machine, drill press, grinder, jointer,

(Continued on page 54A)

American "Tech Books"

Save Time — Improve Course Content

1. Automotive Electrical Systems — *Frazee-Bedell* — $4.90
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3. Rights of American Workers — *McCarthy* — $1.00
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5. Electric Arc Welding — *Austin* — $3.90

Just Published

6. Outboard Motors and Other Two-Cycle Engines — *Frazee-Bedell-Venk* — $3.95
7. Automotive Fuel and Ignition Systems — *Frazee-Bedell*

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8. A Procedure for Evaluating a Local Program of Trade and Industrial Education

Here, at last, is a critical evaluative instrument suitable for measuring the effectiveness of any T & I program, either in part or in its entirety. Sponsored by leading National education associations. $1.50

Improve Your Professional Status

9. Development of Vocational Education — *Hawkins-Prosser-Wright* — $7.25
10. Vocational Education in a Democracy — *Prosser-Quigley* — $6.50
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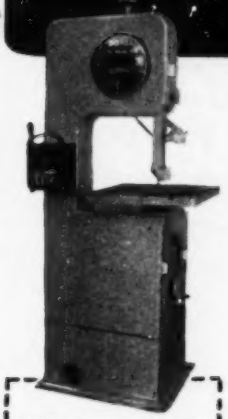

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16" COMBINATION WITH WELDER
SAWS • FILES • POLISHES

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BETTER for the School Shop Budget
BEST for the Student

STUDENTS quickly acquire skill, develop pride of accomplishment and enjoy learning to machine a great variety of materials with professional ability on this safe, easy to operate contour sawing, filing, polishing machine.

Because of its construction features and responsive control of variable tool speed in both high and low range, the Utility DoALL is capable of turning out school shop projects to the most exacting standards of workmanship and accuracy.

This machine invites comparison—price and performance. Ask for a free demonstration. Call your local DoALL Sales-Service Store or write:

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20 Lbs..... $17.00
40 Lbs..... 30.00
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Finest quality and the best colors in all new, flat, paper-masked Plexiglas and Lucite. Sizes 6" x 12" and larger in the assortment.

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New BERGER drafting kit for students will make your teaching job easier... help your classes learn faster

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Patent Pending

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The red handle with the black head—exclusively PLUMB
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Autograf Hatchet—Extra beauty added to Plumb quality
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Get Prompt Service from one of the largest stocks of leather, lacing, kits and accessories in the country! A Leather Headquarters since 1910... We specialize in Complete Service to schools and hobby groups, whether beginners or advanced, children or adult.

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82 large fascinating pages, packed with a wealth of instructive and useful information, project ideas, etc. Thousands of items listed. Highest quality, moderately priced. We'll rush a copy. — Write to Dept. IA-5.

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SHOP EQUIPMENT NEWS

(Continued from page 52A)

lathe, motors, planer, metal and wood shapers, scroll saw and welder.

For copies of these catalogs, write to *Delta Power Tool Division, Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.*

For brief reference use IAVE — 0502.

NEW DI-ACRO POWER ROD PARTER

A new and improved Di-Acro Power Rod Parter for cutting 1/16 to 5/8-in. rods and bars without burr and distortion is announced by O'Neil-Irwin Mfg. Company.

Principal improvement in the Power Rod Parter is the replacement of an air-operated power unit with a motor driven flywheel. The flywheel drive — operating at 180 strokes per minute — provides six times the cutting speed previously available.

Cutting ⅝-in. bar stock with new Di-Acro Rod Parter

An Electomatic Gauge, supplied as standard equipment with the Power Parter, allows the separate operation of gauging, ejecting, and cutting to be performed in a single working cycle. Materials can be "parted off" as fast as the operator can feed stock through the cutting heads and engage the foot clutch.

For further information write to *O'Neil-Irwin Mfg. Co., 544 Eighth Ave., Lake City, Minn.*

For brief reference use IAVE — 0503.

A NEW USE FOR GAUGE BLOCKS

Up until now gauge blocks have been used principally as standards for checking common gauging and layout instruments.

Now they also will be used to assemble gauge blocks into gauging instruments for *practically any gauging or layout application.* The system provides three extremely important benefits.

1. It permits the direct application of gauge block accuracy to everyday gauging and layout operations.

2. It elicits more productivity from personnel because it eliminates the "doubt" that exists when measurements are transferred from gauge blocks to less accurate instruments.

3. This gauging development reduces or completely eliminates the outlay for special toolroom or production gauges because its flexibility permits the construction of practically any type

(Continued on page 56A)

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The Wipe-on" Finish that
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- Needs no sanding between coats

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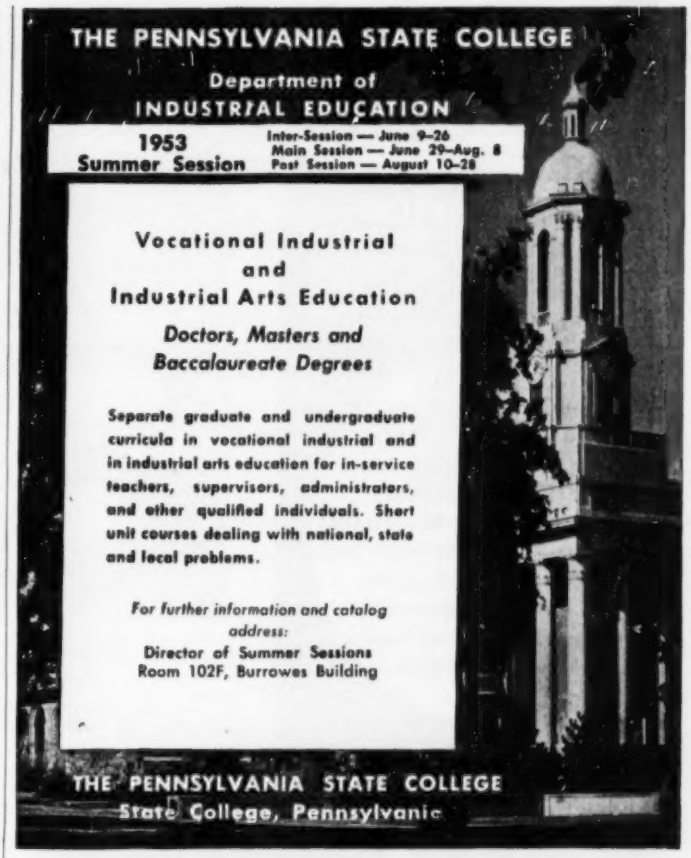
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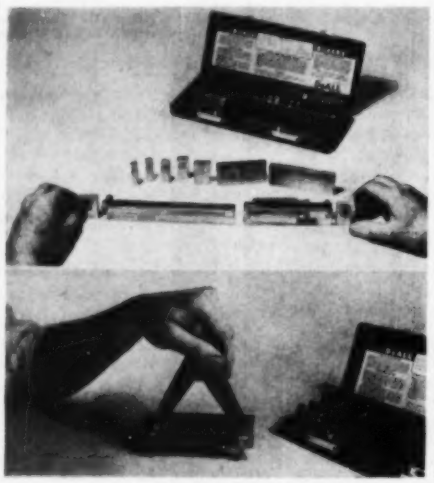
SHOP EQUIPMENT NEWS

(Continued from page 54A)

gauge for any common or special application.

The new development is designated the "Micro-Step" system by The DoAll Company, its originator. Essentially, it is a series of gauge block



The Micro-Step system by the DoAll Company

(Top) The gauges and how they are assembled. (Bottom) The caliper holder for assemblies up to 6 in. long.

(Continued on page 58A)

SPECIFY AND INSIST UPON GENUINE
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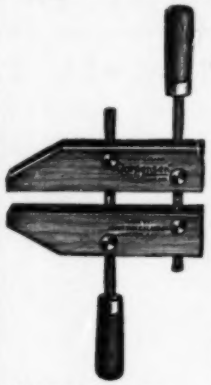

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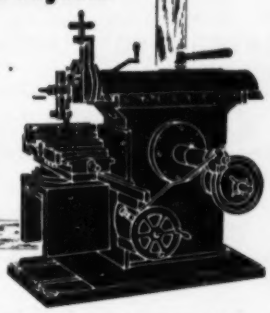

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SHOP EQUIPMENT NEWS

(Continued from page 56A)

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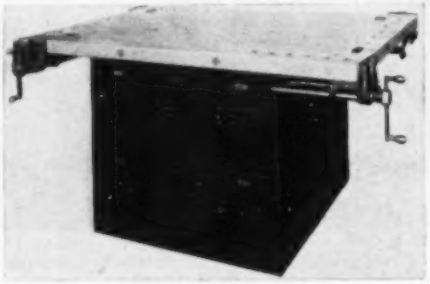

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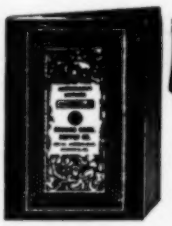

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SHOP EQUIPMENT NEWS

(Continued from previous page)

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NEW STANLEY FILM STRIPS – PLANE SERIES

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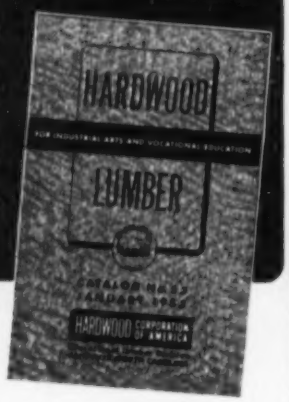

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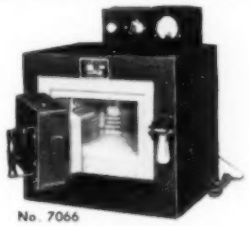

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INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

P. O. Box No. 2068

MILWAUKEE 1, WISCONSIN

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INDUSTRIAL ARTS AND VOCATIONAL EDUCATION May, 1953
400 North Broadway, Milwaukee 1, Wis.

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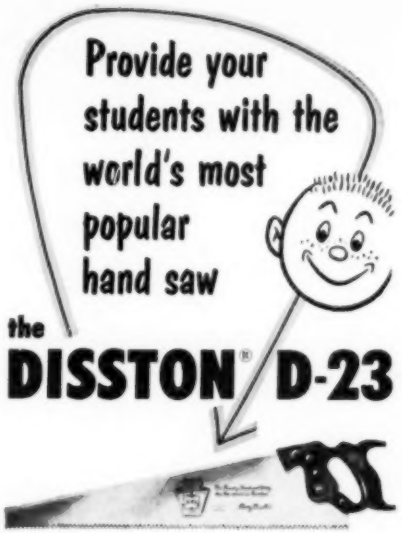

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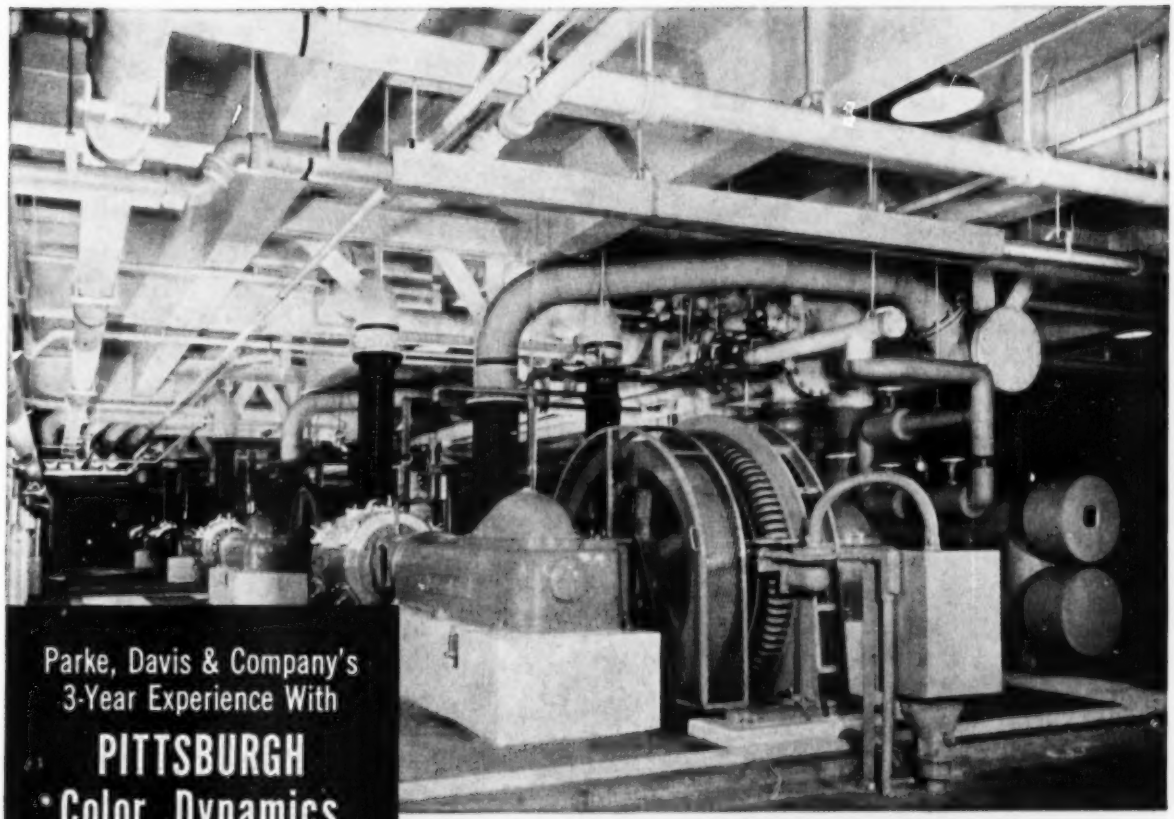

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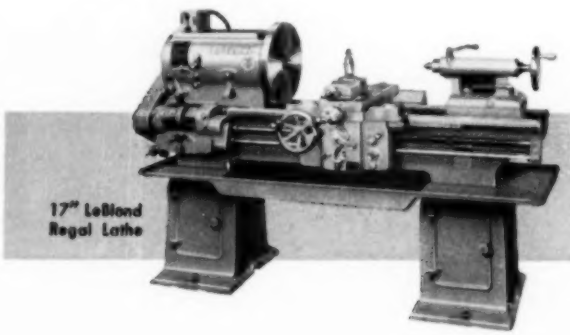

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